Prevalence of HIV infection in western Uganda; temporal trends and public awareness

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Elizabeth L. Chapman ©

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University of Alberta

Faculty of Graduate Studies and Research

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Dr. Walter Kipp

Dr. Paul Veugelers

Mr. Gian Jhangri

Dr. Stan Houston

Dr. Duncan Saunders

Date 25. 8. 06

Abstract

This study comprises a secondary analysis of a database of antenatal clinic attenders in Kabarole District, Uganda (n=14878), between 1991-2004. Descriptive statistics, univariate and multivariate logistic regression were used. In addition, a cross-sectional household survey was administered in Fort Portal (n=252) to gather data on public perceptions of HIV prevalence trends, and Focus Group Discussions were conducted (n=68) to expand on the household surveys.

HIV prevalence decreased in all geographic strata of Kabarole District between 1991-2004, particularly among women 15-19 years of age. In multivariate analysis, HIV risk decreased over time in women aged 15-19 years after adjusting for marital status, time, site, education and occupation.

The public was found to have a high level of knowledge and awareness of HIV/AIDS, but less than half of the sample was aware of the declining HIV prevalence trends, indicating that Uganda's "success story" has not been effectively communicated to the public.

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ABBREVIATIONS AND ACRONYMS

ABC	Abstinence, Be Faithful, and Use A Condom
ABY	Abstinence and Be Faithful for Youth
ACP	AIDS Control Program
AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Clinic
ARV	Anti-Retroviral Drugs
AYA	African Youth Alliance
BHS	Basic Health Services
DDHS	District Director of Health Services
DHS	Demographic and Health Survey
ELISA	Enzyme-linked Immunosorbent Assay
EPI	Expanded Programme on Immunization
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GTZ	Deutsche Gesellschaft fur Technische Zusammenarbeit (German Technical Cooperation)
HIC	Health Information Centre
HIV	Human Immunodeficiency Virus
KAP	Knowledge, Attitude and Practice survey
LC1	Local Council 1 (village level administrative unit)
LC2	Local Council 2 (parish level administrative unit)
LC3	Local Council 3 (sub-county level administrative unit)
LC4	Local Council 4 (county level administrative unit)
LC5	Local Council 5 (district level administrative unit)
MOH	Ministry of Health
NACP	National AIDS Control Programme
NGO	Non-Governmental Organization
PMTCT	Prevention of Mother-To-Child Transmission
RPR	Rapid Plasma Reagent Test
SD	Sugar Daddy
SM	Sugar Mommy
STD	Sexually Transmitted Disease
TASO	The AIDS Support Organization
TPHA	Treponema Pallidum Haemoagglutination Assay
UBOS	Ugandan Bureau of Statistics
UVRI	Uganda Virus Research Institute
VCT	Voluntary Counselling and Testing
WHO	World Health Organization

Chapter 1 - Introduction

Uganda is commonly regarded as a success story with regards to reducing its human immunodeficiency virus (HIV) rates. According to the UNAIDS 2006 AIDS epidemic update, Uganda is among only three sub-Saharan African countries (the other two are Kenya and Zimbabwe, with decreases in urban Burkina Faso as well) that have documented declines in their HIV prevalence. HIV prevalence among pregnant women attending antenatal clinics (ANCs) in Uganda declined from about 30% in 1992 to 10% in 2002 (Ugandan Ministry of Health 2003); this decline is supported by HIV incidence data from cohort studies. Most information supporting the decline comes from urban areas, where a significant drop in the HIV prevalence has indeed been observed throughout the country. This declining trend has been most marked in the young age group of 15-24 years. The decline has been widely attributed to behaviour changes lowering the risk of HIV infection, such as increased condom use, reduction of sexual partners, and a decrease in overall sexual activity (Low-Beer and Stoneburner 2003).

Information on HIV/AIDS from rural areas, however, where the majority of Ugandans live, is not easily available, because most sites chosen for surveillance purposes are located in cities and townships. One exception is Kabarole District, where a surveillance system for HIV/AIDS has been in place since 1991 and has included three rural sites: Kasule (until 1994) Rukunyu (until 1994), and Nyabbani (until 2004). In addition, two semi-urban sites, Kyegegwa (until 1994) and Rwimi (until 2004) were included. This anonymous sentinel surveillance for HIV targets pregnant women who are attending antenatal clinics (ANCs) for their pregnancy care. There are only a small number of rural ANC surveillance sites in Uganda, and the fact that rural HIV prevalence data in Kabarole District extends over a period of more than a few years is unusual and advantageous (Kirungi et al. 2006). Therefore, the Kabarole District ANC database provides an opportunity for research and comparison of prevalence trends in urban and rural areas, allowing a better understanding of the HIV epidemic in Uganda and the impacts of prevention efforts.

The lack of data on the public's awareness of the declining HIV trends in Uganda also presents an opportunity for research, as communication to the public regarding the outcomes of health campaigns is important in order to reinforce public health measures and to gain support for them among the general population. Furthermore, insight into the public's perception of declining HIV trends could contribute to a better understanding of the true cause of the decline in HIV prevalence in Kabarole District and provide useful information for targeting and implementing future AIDS control initiatives.

In a context in which the AIDS pandemic is increasing at an alarming rate almost everywhere in the world, the knowledge gained from this study could ultimately contribute to a discussion of whether Uganda can be considered a model of HIV prevention for the global community.

Background

AIDS in Africa and the Ugandan response to AIDS

Uganda, a lush and beautiful country often referred to as "The Pearl of Africa", is located in sub-Saharan East Africa on the shores of Lake Victoria. Its population is roughly 22 million, and it is bordered by Rwanda to the southwest, Tanzania to the south, Sudan to the north, and Kenya to the east (see Appendix A). It is a predominantly rural, agriculturally based country, and is among the world's poorest with an estimated per person Gross Domestic Product (GDP) of US$249 in 2001 (Parkhurst 2004). Uganda endured many years of civil war from the 1970s until 1986, when President Yoweri Museveni and the National Resistance Movement established a reasonably stable government. This period of instability coincided with and aided the development of an explosive HIV epidemic; in 1982, the country's first cases of HIV were detected in Rakai district. Since then, AIDS has grown to a cumulative 2 000 000 infections in Uganda in 2000 (Okware et al. 2005), and has killed an estimated 940 000 Ugandans; most of these have been men and women of childbearing age, leaving close to one million Ugandan children orphaned (Human Rights Watch 2005).

Uganda's national AIDS control initiative, the Uganda National AIDS Control Programme (NACP), was implemented in 1986 by President Museveni (Okware 2005). Uganda is unique among African nations for its early and high-level leadership against HIV/AIDS and its open acceptance of its HIV problem, in contrast to the denial seen in countries such as South Africa (Parkhurst 2004). The government's (and in particular President Museveni's) willingness to address HIV/AIDS openly and break taboos surrounding sexuality is often credited as the cornerstone of its early success against the epidemic. With the full support of its government, Uganda's response was wide-ranging. Despite the disadvantages of a struggling health infrastructure devastated by war, the country launched an aggressive media campaign involving posters, radio messages and rallies; the training of teachers to begin effective HIV/AIDS education; and the mobilization of community leaders, religious leaders, national celebrities and the public in general. To the government's credit, it allowed – and, through policies, even enabled - non-state actors such as non-government organizations (NGOs) and churches to take leading roles in HIV prevention, resulting in a range of messages and approaches that worked very effectively for tackling the HIV epidemic in a diverse population (Parkhurst 2002, 2004). A central component in Uganda's HIV/AIDS control strategy was the 'ABC' approach to promoting behaviour change: Abstinence, Be faithful, and Condom use (Kilian 2000). By 1992, a decrease in HIV prevalence rates in pregnant women attending antenatal clinics (ANCs) was observed, and this trend began to solidify by 1995. The German Technical Cooperation (GTZ) began providing support and assistance to Uganda's National AIDS Control Programs in 1986, initially with the introduction of facilities for HIV testing and support to the Uganda Virus Research Institute (UVRI) in Entebbe. In 1990, GTZ shifted its emphasis to the prevention of new infections through health education, promotion of condom use and treatment of STDs, as well as counselling and care of AIDS patients. At this time, the project area was also shifted to two districts in Western Uganda: Kabarole and Bundibugyo.

Kabarole District and the AIDS Control Program

Kabarole is the core territory of the Toro Kingdom, located in Uganda's verdant south-west (see Appendix B). Its estimated population in 2001 was 975 775 (Kilian 2000), and the dominant ethnic group in the region is the Batoro, with substantial numbers of Bakiga and Bakonjo people as well. The majority of the population (88.5 %) live outside of urban centres (UBOS 2002) and depend on subsistence farming, as tea plantation is the major industry in the District. Matooke (a cooking banana that grows abundantly in the area), maize, beans, millet and rice are the main staple foods.

A monograph by Kilian (2002) outlines HIV/AIDS control strategies in Kabarole District, where the HIV epidemic appeared in the early 1980s and made Kabarole one of the most severely affected areas in Uganda. GTZ-supported AIDS control activities in Kabarole District were integrated into already existing infrastructure and personnel, as an integral part of the project "Basic Health Services (BHS) Western Uganda" (GTZ 2003). In 2000, Kabarole was split into three Districts, namely Kabarole, Kamwenge and Kyenjojo. For the purposes of

AIDS control, all three districts remained in the project area of "Basic Health Services Western Uganda".

Kilian identifies some key elements that have been central in the success of the programme, which was implemented in 1990. One of the cornerstones of the Kabarole AIDS Control Program was behavioural change communication, which focused on explaining HIV transmission, clarifying myths and "making a lot of noise" about the HIV/AIDS programme. To do this, various types of media were used, including posters, t-shirts, billboards, drama performances, community meetings, and sports events. The opening of a local radio station, "Voice of Toro" in 1996 made radio one of the most important tools for communication of HIV/AIDS information, as over 70% of Kabarole households had functioning radios. Once awareness of HIV/AIDS had been raised and attitudes began to change, the focus shifted to translating knowledge into behaviour change. Preventive activities largely targeted the younger generation, who were in the process of forming their sexual behaviour patterns. In Fort Portal, the "Health Information Centre" (HIC) was a place where young people could gather and interact, and access HIV/AIDS resources, including the popular "Straight Talk" newspaper, which gives safer sex and life skills information to youth aged 15-24 years. Drama groups, condom promotion and marketing with a local condom brand "Engabu", STD treatment and voluntary counselling and testing services (VCT) were other important aspects of the programme. With the introduction of antiretroviral drugs (ARVs) to developing countries in the late 1990s, a prevention of mother-to-child transmission of HIV (PMTCT) project was introduced in Kabarole District in 2001.

Literature review

A search was conducted in MEDLINE (Ovid, 1966-present) and Pubmed using combinations of the keywords "HIV", "prevalence", "trends", "Uganda", "rural", "urban", "perceptions", "awareness", "surveillance", "risk", and "antenatal clinic" in order to find literature pertaining to the thesis topic. Thirty-nine relevant articles were found, including 34 that focused primarily on Uganda's HIV epidemic. An additional 19 articles were cross-referenced from the original articles found in the literature search. Other sources of information apart from the literature search included documents and reports from the Ugandan Ministry of Health (MOH), the Uganda Bureau of Statistics (UBOS), Kabarole District (unpublished data), multilateral organizations (UNAIDS and the WHO), development organizations (GTZ), and NGOs (Human Rights Watch).

HIV prevalence trends in Uganda: the evidence

There are currently three main sources of data on HIV trends in Uganda. These are cohort studies describing trends in HIV incidence, ANC surveillance data which describes trends in HIV prevalence, and national sero-behavioural surveys.

Cohort studies

HIV incidence, defined as the number of new HIV infections over a specified period of time (Chin 1990) is the most accurate and reliable epidemiological measure of HIV trends (Wawer 1997, Whitworth 2002, Mbulaiteye 2002). However, cohort studies are not without their disadvantages. Cohort (incidence) studies require substantial resources, well-defined cohorts and a high level of follow-up (Kilian 1999). Volunteer bias can occur, and these studies require political stability and governmental support, something that has been difficult in parts of Uganda, such as the south-west during the conflict with the Allied Democratic Forces beginning in 1996 and in the north, where there is a continuing civil war (IRIN 2006). Few major cohort studies measuring HIV incidence have been conducted in Uganda. Two of these, the Rakai and Masaka cohorts, will be briefly described here.

Masaka cohort

A sample of approximately 4000 people in a cluster of 15 villages in rural Masaka district (southwestern Uganda) has been extensively studied through annual demographic and serological surveys since 1989. Published studies by Mbulaiteye et al. (2002), Whitworth et al. (2002), Kamali et al. (2000), Mulder et al. (1995) and Nunn et al. (1997) have all demonstrated a declining HIV incidence in this population. The most recent study (Mbulaiteye et al. 2002) shows a 37% decrease in incidence over the period 1990-1998 in all age groups, as well as declining prevalence, especially among men below 29 years and women below 24 years. The decline in incidence and prevalence was associated with risk-lowering sexual behaviour change, although it was not clear whether this change was due to the severity of the HIV epidemic itself, or to government/media health education messages (Whitworth et al. 2002). Also, in this study the Hawthorne effect (a tendency of research subjects to act atypically as a result of their awareness of being studied) was seen to be partially responsible for the trends. It is important to note as well that several of the Masaka publications noted a rise in HIV prevalence over time in women aged 30-39 years that is likely due to a cohort effect.

Rakai cohort

Results from the Rakai cohort, consisting of 1945 households from 50 villages in rural Rakai district followed since 1989, have not been so encouraging. Between survey periods, the project provided health education, condoms and HIV testing and counseling to the study population (Konde-Lule et al. 1997). In an abstract presented at the XI International AIDS Conference, Ssegonzi et al. (1996) reported a decline in HIV prevalence of almost 5 % among young adults in this cohort between 1990 and 1992. In a two-year follow-up study of this cohort (Wawer 1997) demonstrated that HIV prevalence had declined among young adults from 1990-1993; however, HIV incidence rates had remained stable due to HIV/AIDS-related mortality, migration and differential inclusion.

Konde-Lule et al. (1997) conducted a two-year follow-up (1990-1992) of the Rakai cohort and concluded that, despite reported behavioural changes, HIV incidence remained substantial. Adolescents and young women were identified as vulnerable groups. Wawer et al. (1994) conducted serological, sociodemographic and behavioural surveys in randomly selected communities in rural Rakai district, as a one-year follow-up to a 1989 study. The study found that HIV incidence in the general population was fairly high (2.1/100 person years), and that the proportion reporting multiple sex partners had increased from 1989 to 1990. Furthermore, HIV-related mortality was high, and there was net out-migration, which removed substantial numbers of HIV-positive individuals. The study concluded that despite preventive programmes, the incidence of HIV infection remained high in this rural population.

The most recent findings from the Rakai cohort are sobering. Wawer et al. (2005) reported that overall prevalence declined in adults and young adults (20-24 yrs), but it did not decline in adolescents aged 15-19 yrs. Furthermore, a slight increase in HIV incidence was observed in Rakai District from 1.3/100 person-years in 1994-95 to 1.7/100 person-years in 2002-03. The behaviour change implications of these findings will be discussed later in this chapter.

ANC serosurveillance studies

From about 1993, declines in HIV prevalence have been reported in young women attending ANCs in Uganda, as indicated by several studies from various parts of Uganda. It should be noted that the existing studies present information from predominantly urban and peri-urban areas.

Asiimwe-Okiror et al. (1997) reported a 40% overall decline in HIV prevalence in two urban sites (Kampala and Jinja) between 1989-1995. This decline was attributed to behaviour change in urban settings - increased condom use, delay of onset of sexual activity, and a decrease in casual sex - which was measured in population-based behavioural surveys. Kilian et al. (1999) conducted a prevalence study using ANC data from Fort Portal, an urban centre in Kabarole district. The study found that prevalence had declined by 68% between 1991-1997 in women aged 15-19. In women aged 20-24 prevalence had increased until 1993 (19.9% to 31.7%) and then declined thereafter (to 21.7%). This decrease also was also linked with behaviour change (possibly increased condom use). ANC data closely reflected the female general population as estimated from a population-based serosurvey; however, in older age groups (25-29 years) it showed significantly lower HIV rates than the general population.

A study by Fabiani et al. (2001) analyzed ANC data from pregnant women in Gulu District (northern Uganda) from 1993-1997, and noted an overall decrease from 26.0% to 16.1%; this decrease was noted in both rural and urban areas of the district. This trend, however, showed a slight increase in 1997. Hypothesizing that this increase could be indirectly due to civil strife in the north of Uganda, Fabiani investigated the same ANC data from 1996-1999 (Fabiani et al. 2001b). Overall HIV prevalence still showed a significant decrease over time, but analysis of data by area of residence showed that although women living in urban areas of Gulu district experienced a significantly decreased prevalence, women living in the rural areas experienced a significantly increased prevalence, especially those less than 30 years of age. This increase could be due in part to civil strife in the area and massive population displacement to high population density camps located in rural areas. This study underlines the importance of local contexts, and stratification of the population by age and site even when generalized declining HIV prevalence is reported.

Antenatal clinic (ANC) surveillance: strengths and weaknesses

ANC surveillance data provides a measure of HIV prevalence – the number of HIV infected persons in a population (Chin 1990). Routine surveillance of HIV infection has been established over the past decade in many countries around the world (Mertens 1996) and is the principal means of monitoring the HIV epidemic in sub-Saharan Africa (Fabiani 2003). In Uganda, sentinel surveillance was first established in 1987 in women attending ANCs (Asiimwe-Okiror 1997) and was instituted by Uganda's Ministry of Health AIDS Control Programme in 1989. ANC surveillance uses blood specimens collected for syphilis testing, ensuring anonymity by eliminating or unlinking identifying data. Thus, there is no need for informed consent, and no need for counseling or social support services. Most importantly, ANC serosurveillance minimizes participation bias. Of course, an ethical issue is raised in that ANC attenders who do not choose to be tested for HIV voluntarily will not learn if they are HIV infected, and thus will be less able to access available support and treatment; however, a discussion of this issue is beyond the scope of this thesis.

ANC surveillance data, although easy and cost-effective to collect, must be carefully approached as a measure of HIV in the general population, due to several possible biases. One bias is that by definition, women attending ANCs are sexually active. Since this is usually not the case in the younger age groups (this could become more significant if behavioural changes such as later onset of sexual activity are taking place), ANC data may overestimate the true level of HIV infection in these younger groups (Kilian 2000). Also, women with HIV infection tend to have lower fertility, and thus will use ANCs less frequently (Kilian 1999, Zaba 2000, Fabiani 2003); this effect becomes more pronounced in older women with more advanced infection, so that ANC data may underestimate the true level of HIV infection in the older age groups. Thirdly, ANCs exclude women who use contraceptives, a group that may be engaging in high-risk sexual behaviour (Kilian 1999). This is offset, however, by Uganda's relative lack of family planning and resulting low rates of contraceptive use. An additional factor is that not all pregnant women avail themselves of ANCs, due to geographical distance, cultural beliefs or other factors (Zaba 2000).

Another challenge to the generalizability of ANC data, as cited by Allen (2006), is that at ANC surveillance sites, data are not usually available with which to adjust antenatal surveillance for AIDS-related mortality. Finally, ANC clinics are also thought to have an over-representation of younger mothers, because more experienced women are more likely to choose to give birth at home; for this reason, the ANC data may not accurately represent the HIV prevalence in the 'sexually active population' (Allen 2006).

Given these biases, HIV prevalence among the younger age group (15-19 years) is considered the best proxy measure for incidence. This group has been sexually active for a shorter period, therefore HIV prevalence among young women is reflective of recent infection (Kirungi et al. 2006); furthermore, any fall in prevalence among them is unlikely to be due to AIDS-related mortality (Parkhurst 2002).

Due to the above biases, ANC data can tend to overestimate HIV prevalence in younger women, and underestimate it in older women (Hladik et al. 2005). Various methodologies have been proposed for extrapolating ANC data to the general population. Most attempt to adjust for differences in fertility between HIV-positive and HIV-negative women (Fabiani 2003, Zaba 2000); some also adjust for HIV prevalence among women who do not attend ANCs, such as those using contraceptives, have become sterile, or are not sexually active (Zaba 2000).

In some parts of Uganda, including Kabarole District, anonymous HIV testing in ANCs has been discontinued due to lack of funds. HIV surveillance will continue in these sites through VCT and PMTCT services, meaning subjects must give their consent to an HIV test. Recent studies have shown that data from VCT/PMTCT programs cannot replace anonymous HIV surveillance because women going for VCT who consider themselves at high risk for HIV infection are more likely to seek VCT/PMTCT services, making this a strongly self-selected population, especially when there is low uptake of these services in an area (Mpairwe et al. 2005). However, despite heavy self-selection, VCT data would include test results from men that are currently excluded by ANC data (Hladik et al. 2005). Furthermore, VCT and PMTCT surveillance would result in direct benefits for those being tested, unlike the anonymous unlinked testing. Most studies on the subject have recommended that ANC data be supplemented with, not replaced by, VCT and PMTCT data (Hladik et al. 2005, Bayarama et al. 2004). Therefore, it is uncertain whether Uganda will continue to be able to adequately monitor its HIV prevalence through VCT and PMTCT services alone.

Lack of rural ANC serosurveillance data

Antenatal surveillance coverage depends on the pre-existing infrastructure in the area concerned, and the urban/rural balance of ANC sites will reflect this. Although a small number of rural sentinel surveillance sites do exist in Uganda, the vast majority are located in urban or peri-urban areas (Allen 2006) despite the fact that, as Parkhurst (2002) points out, approximately 87 % of the Ugandan population lives in rural areas.

Other than the intense scrutiny that has been accorded to the two rural cohorts in Uganda (which dealt with HIV incidence), most HIV prevalence data comes from urban areas. This is a problem that has been pointed out by several researchers: Asiimwe-Okiror (1997) states that the decline in prevalence based on ANC data is mostly a feature of urban centers, and Wawer (1997) indicates that rural ANC surveillance sites are severely underrepresented in many countries.

This unfortunately gives an incomplete picture of the country's HIV levels, especially given studies that suggest that rural areas are not keeping up with the rest of the country's HIV declines. A 1994 study by Wawer noted a high HIV incidence in remote rural villages despite preventive programmes and substantial knowledge about AIDS, suggesting that greater priority should be given to rural communities. In Kabarole District, AIDS interventions have been implemented at a much lower level in rural areas (ie Nyabbani) than in urban areas (Fort Portal) (W. Kipp, personal communication, April 2005). This seems especially worrisome given the relative lack of behaviour change observed in some rural areas: for example, low rates of condom use in rural areas as reported by Opio et al. (1997) and Kengeya-Kayondo et al. (1999). In addition, risky sexual practices commonly perceived as 'urban' have been shown to be present in rural areas: Kelly et al. (2003), reported a high HIV prevalence among young women in rural areas who had much older sexual partners; and Koenig et al. (2004) estimated a high prevalence of coercive sex in rural areas.

The news, however, is not all bad, as declining HIV prevalences are beginning to be reported in some rural areas of Uganda, such as in Gulu District. However, the need for analysis of rural HIV prevalence data has been identified by several researchers including Parkhurst (2002) and Zaba (2000b), and the need for more vigorous pursuit of AIDS control measures in rural areas has been underscored as well (Asiimwe-Okiror et al. 1997). Zaba (2000b) recommends expanding sentinel surveillance to include family planning centres, smaller rural clinics where births take place, or even home births attended by traditional birth attendants; this expansion could address social selection for ANC attendance.

National sero-behavioural surveys

There have been two national sero-behavioural surveys carried out by the Ugandan Ministry of Health since the implementation of the national AIDS Control Program: one in 1992, and another in 2004-2005. In the 1992 survey, an HIV prevalence rate of 18% was found in the general population. The latest survey, of which only the preliminary results have been made public, shows a substantial decline in HIV prevalence. The study involved 18 000 Ugandan men and women from all parts of the country, aged 15-59 years. Their blood was taken for HIV testing, and they were interviewed about their knowledge, attitudes and practice regarding HIV/AIDS. According to this survey, 7 % of the Ugandan population is infected with HIV. 7.9% of adult women are HIV-positive and 6.0 % of men. People in urban areas had an infection rate of 10.7 % compared with 6.4 % in rural areas (Ministry of Health 2005).

The Ugandan "Success Story": Interpretations and controversy

It was the findings of decreasing HIV incidence from the Masaka and Rakai cohorts that first triggered talk of Uganda's 'success story' (Allen 2006). ANC surveillance, too, has shown a dramatic decline since its peak in 1990 at nearly 31 % in urban surveillance sites (Parkhurst 2004). That HIV prevalence in Uganda has declined is undesputable; however, precisely which interventions or other phenomena are responsible for the decline is a question of ongoing debate. There is currently no consensus in the literature on precisely what kind of change has occurred, and over what time period. Unfortunately, the lack of concrete explanations behind Uganda's success has allowed commentators, journalists, aid organizations and politicians to interpret it in ways that suit their own purposes (Allen 2006). These purposes, as suggested by Parkhurst (2002), can include avoidance of 'donor fatigue'; bowing to political pressure to present a particular image of success to maintain funding for HIV and other programs.

Misinterpretation of prevalence trends

Misinterpretation of HIV prevalence trends has, in some instances, led to an exaggeration of Uganda's success. Parkhurst (2002) draws our attention to reported findings from antenatal clinic surveillance sites in urban areas, which, although they cannot be considered representative of the general Ugandan population, have led to biased, overly optimistic conclusions about the decline in HIV. Parkhurst further argues that current claims that HIV incidence rates in Uganda have fallen, based on HIV prevalence data, are premature. He underlines the disparities between prevalence and incidence, citing the fact that despite a decline in prevalence, overall incidence can remain stable or even increase in the presence of high AIDS-related mortality, a fact reported by Wawer et al. (2005). In his illuminating article, Allen (2006) illustrates a different aspect of HIV prevalence interpretation: with the advent of ARV drugs, HIV-positive individuals are living longer and therefore a rise in HIV prevalence should not necessarily be misinterpreted as a bad sign, but rather, an indication of a positive outcome of AIDS treatment.

The role of the government

The HIV decline is often attributed to specific interventions introduced by the Ugandan government (Parkhurst 2002). This view ignores the many other players who have contributed, including NGOs, religious groups and community associations. The attribution of the success to HIV/AIDS policy in Uganda also ignores the fact that the epidemic in Uganda is older than in most countries in sub-Saharan Africa, and there was high AIDS-related illness and mortality before the national HIV/AIDS program was set up in 1987. Parkhurst (2002) has suggested, based on data from the Rakai and Masaka cohorts, that HIV incidence had already begun to fall in certain districts of Uganda prior to that year. This could be evidence that experience of the epidemic through sickness and deaths of loved ones could be altering sexual behaviours.

Behaviour change: A, B, or C?

Although it cannot be denied that Uganda has experienced a decrease in its HIV prevalence since the early 1990s, the question of whether behaviour change or the natural course of the epidemic was responsible has been a complicating factor in interpreting the declines. Authors such as Kilian et al. (1999) have solidified the behaviour change hypothesis through comparing observed prevalence trends with mathematical models that simulate behaviour change. Models attempting to link prevalence trends with behaviour change must take into account changes in risk behaviours resulting from AIDS-associated morbidity and mortality (natural, or "endogenous" changes) as opposed to those resulting from interventions (Hallett et al. 2006). Hallett et al. applied such a model to various countries for which ANC serosurveillance data were available, including 5 ANC sites from Uganda. The authors concluded that in Uganda, parts of urban Kenya, Zimbabwe and urban Haiti, prevalence had declined further than would be expected through the effects of mortality alone, suggesting that in these countries individuals have begun to adopt safer sexual behaviour.

The most common behaviour changes felt to have influenced the decline in HIV prevalence in Uganda relate to the 'ABC' strategy. Numerous studies in the literature have supported different behaviour changes, including abstinence, later age of sexual debut, condom use, reduced number of sexual partners and faithfulness (Low-Beer and Stoneburner 2003), Hankins 1998, Mulder 1995). However, a recent study by the authors of the Rakai cohort studies (Wawer et al. 2005, abstract) has indicated that from the mid-1990s up to the present, the main reasons for the declining HIV prevalence have been increased condom use with casual partners, and HIV-related mortality. In the Rakai cohort, age at sexual debut was found to have decreased and incidence of multiple sexual partners had increased in the young age group, although condom use for casual partnerships had increased. This study could indicate that abstinence-only programs, which are a currently emphasized aspect of Ugandan AIDS control (Human Rights Watch 2005), are not adequate on their own to lower HIV levels, and that the three-part ABC strategy, which includes condom use, should be reinforced.

Green and Witte (2006) have extensively described the fear-based elements in Uganda's AIDS control strategy, which included sending the message that AIDS is a death sentence and using images of suffering and death in AIDS prevention campaigns. They postulate that a high level of fear, combined with the public's knowledge that they could do something to avoid being infected (this was achieved through education on the ABC strategy) resulted in optimal conditions for behaviour change. "Fear appeals", according to these authors, were strongest during the early stages of the national response (1986-1991) which coincides with a major decline in HIV incidence.

The connection between the lived experience of the HIV epidemic and behaviour change has been highlighted by several authors (Parkhurst 2002, Macintyre et al. 2001, Whitworth et al. 2002, Okware et al. 2001). These researchers have postulated that behaviour change can come about for reasons other than intervention programmes – for example, as a consequence of seeing friends and relatives die of AIDS, a fact experienced by virtually every Ugandan and harnessed by fear-based approaches to prevention. Allen (2006) provides an argument for further investigation into such phenomena, stating that much of the information presented to explain trends in HIV prevalence is quantitative, and that data based on qualitative 'anecdotes' often go unrecognized by the scientific community. This could be one of the reasons for the controversy in explaining the links between behaviour change and decreasing HIV prevalence trends.

Conclusion

Despite the extensive amount of literature published on the HIV/AIDS epidemic in Uganda, much remains unknown about what exactly has influenced prevalence rates, although it is probable that this varies from one region of Uganda to the next. The 'success story', in all likelihood, has not come about through any one intervention, in any one community type. As a first step in substantiating and explaining the Ugandan 'success story', analysis and interpretation of HIV prevalence data from rural areas in addition to urban areas is essential.

In addition, an understanding of the inter-relating factors impacting HIV prevalence trends will yield valuable information to assist Uganda and other sub-Saharan African countries in evaluating and targeting HIV/AIDS control activities. In order to obtain such information, both quantitative and qualitative research methodologies should be employed in order to make full use of the insights offered by those who have personally experienced the epidemic. To this end, public awareness of HIV prevalence trends, and explanations for these trends as described by the Ugandan public itself, must be established as a first step in understanding the reasons why, rightly or wrongly, Uganda is considered one of the world's foremost HIV/AIDS "Success Stories".

Study Purpose

This study aims to address some of the questions and informational gaps identified in the above discussion. The purpose of the study is to describe trends in HIV prevalence over time in rural Kabarole district, and to identify differences between urban and rural trends. In addition, it aims to assess how effectively the Health Department has communicated the success of its AIDS control programs to the public. Therefore, data was collected regarding the knowledge and perceptions of Fort Portal residents about the success of the Ugandan HIV/AIDS Control Program. Further, the study aims to learn what the residents of Fort Portal consider to be the main reasons for the declining HIV prevalence trends in Fort Portal and Uganda, and their perceptions of these trends, with special attention paid to local-level factors and considerations regarding Uganda's HIV epidemic and its impacts.

Research questions

Specifically, the study aims to answer the following questions:

1) What are the trends in HIV prevalence in rural Kabarole district over the period 1991-2004?
2) How do the rural trends in HIV prevalence compare to the urban trends?
3) Is the public in Fort Portal town aware of a declining trend in HIV prevalence and if so, how does it explain this trend?

Chapter 2 - Methods

Introduction

For this study, data were acquired from three principal sources. The ANC database was obtained from the Kabarole Health Department; information for the household survey was obtained from a random sample of the general population of Fort Portal Municipality, and focus group discussions were held based on a purposive sample of Fort Portal residents. This study site was selected because of the close, ongoing collaboration between the University of Alberta and the Basic Health Services (BHS) program in Kabarole District, and the availability of guidance and research expertise throughout the data collection process.

Ethics and Approvals

The study was approved by the University of Alberta's Health Research Ethics Board on July 12, 2005. Upon arrival in Uganda, further ethical approval was obtained from the Uganda National Council of Science and Technology in September 2005. Approval from both these bodies was granted through submission of the formal research proposal and all accompanying documents. Finally, permission to conduct the study was sought through signed approval from the Kabarole District Director of Health Services (DHS), Dr. G. Kabagambe-Rugamba. This was used in seeking informal permission from LC1 leaders to conduct household surveys in their villages.

Research Team and Training

In order to carry out the research in a context of cultural and linguistic barriers, local residents fluent in Rutooro were hired as research assistants to assist in data collection. The research assistants were chosen based on recommendations by the BHS Team Leader, and other factors such as experience with health research, personability, and written and oral communication skills. The primary investigator hired three research assistants who assisted with data collection for household surveys and focus group discussions (FGDs). In addition to their assistance with data collection, the research team members were able to offer critical insights into and to impart a greater understanding of the context in which HIV/AIDS interventions have evolved in Uganda.

At the start of training, the primary investigator provided all research assistants with copies of the study proposal and questionnaire drafts for the household surveys and focus groups. The research assistants were given time to thoroughly read and familiarize themselves with the study and its objectives, to ask questions and discuss the study. A training manual was created which included an employment contract, step-by-step overviews of data collection processes, education about HIV/AIDS, information about the study design and methodologies, procedures for obtaining signed consent and to maintain subject confidentiality, how to address subject concerns and questions, how to maintain contact with the primary investigator while in the field, and interview skills (such as probing, remaining neutral etc.). Throughout the training, emphasis was placed on a standardized approach to the interview or FGD. Mock-interview exercises were employed during the training sessions and repeated as necessary to achieve the desired level of competence required for the study. Research assistants were trained for one full day in the consent process, the use of the questionnaire and the sampling methodology outlined in the Extended Program on Immunization (EPI) protocol (WHO 1990).

In addition to the research assistants, the research team included a typist/translator who translated the information forms and consent forms into Rutooro. This BHS staff member also assisted in the transcription of FGDs, as she possessed the necessary clerical skills and equipment to complete this task efficiently. Two other translators were also employed for the translation of the household survey questionnaire, the consent forms and the information forms.

Methods: ANC database analysis

1) What are the trends in HIV prevalence in rural Kabarole district over the period 1991-2004? How do the rural trends in HIV prevalence compare to the urban trends?

In order to answer this research question, secondary analysis of antenatal clinic serosurveillance data (n=14878) using SPSS14.0 was undertaken. This analysis permitted the researchers to describe HIV prevalence trends in semi-urban and rural areas of Kabarole District (in addition to urban areas), and to establish the influence of sociodemographic factors such as age, occupation, education and marital status on HIV status over time.

Description of ANC serosurveillance in Kabarole District

In Kabarole District, HIV surveillance began as part of the AIDS Control Program in 1991 in eight sentinel sites: three urban centres (all located in Fort Portal Town, the capital of Kabarole District), two semi-urban sites (Kyegegwa and Rwimi, both trading centres located on major roads) and three rural sites (Nyabbani, Rukunyu and Kasule). In 1994, due to resource constraints, these sites were reduced to just three: Fort Portal, Rwimi and Nyabbani (unpublished data, BHS). ANC attendance in Uganda is reportedly high: 94 % of women in Uganda receive antenatal care according to the 2000-2001 Demographic and Health Survey, although only a small minority give birth in health clinics. In Kabarole District, usage of ANC clinics is high and at last measurement was 90 %; however, similar to the rest of the country, the percentage of Kabarole women who give birth in ANC facilities is very low (unpublished data, BHS).

Sample collection for HIV testing was undertaken twice per year, approximately in April and October, although this was variable according to BHS annual lab reports. All women attending the ANC for the first time in a given pregnancy during the 10-12 week collection phase had their blood collected for routine syphilis screening, up to a target sample size of 200-300 in rural and semi-urban sites and 300-500 in urban sites. Residual blood from this collection was coded and sent to Buhinga Hospital in Fort Portal for HIV testing, without a possible link to the women (unlinked, anonymous testing). The target sample size was reached in most years, with the notable exception of Rwimi ANC, where no samples were collected in 1998 due to the health centre being turned into a cholera treatment facility following a local outbreak. For unknown reasons, no samples were collected at any of the three sites during the first phase of the year 2003.

All serum samples were tested using an enzyme-linked immunosorbent assay (ELISA) test at the HIV laboratory at Buhinga Hospital in Fort Portal. Quality control was done on a random sample of positive tests at the Uganda Virus Research Institute in Entebbe. Indeterminate ELISA results (neither positive nor negative) were confirmed with Western blot techniques. Sociodemographic information on women in each collection phase was collected by health workers and sent to Fort Portal, where it was entered into the database by a statistician.

Description of the database

The ANC database includes HIV prevalence data for Kabarole District from the years 1991-2004, and was obtained from the Kabarole Health Department. These data consist of three sets of HIV blood test results from pregnant women visiting ANCs in Kabarole District, western Uganda, using serum which was drawn routinely for syphilis screening. One data set is from three rural sites from the period 1991-1994 (Rukunyu, Nyabbani and Kasule) and one rural site from the period 1995-2004 (Nyabbani). The second data set is from two semi-urban sites (Rwimi and Kyegegwa) from 1991-1994 and one semi-urban site (Rwimi) from the period 1995-2004. The third data set is from the urban site, Fort Portal, from the period 1991-2004.

The three data sets contain information pertaining to HIV status (positive, negative or undetermined) as well as several sociodemographic variables. These are site (urban, semi-urban or rural); year (1991-2004); time (denoting the biannual testing phase); age in years; parity; occupation (farmer/peasant, businesswoman, shop owner, servant, student, and other; marital status (single, married monogamous, married polygamous, divorced, or widowed); and educational level attained (illiterate, read Rutooro, write Rutooro, read/write English, primary school, secondary school, university). The database also contained data on syphilis test results, but these were not of interest to our study and were excluded from the analyses.

Data Analysis

The ANC database was obtained from the Kabarole Health Department in Fort Portal in Stata format, and this was converted to SPSS format for analysis on the researcher's computer. A statistician assisted in identifying the variable codes and explaining the methodology of data collection.

a) Descriptive statistics (data preparation and deleted cases)

Data "cleaning" was undertaken in SPSS14.0 by first excluding all ANC attenders under the age of 15 (n=134) from the database (n=15012), in keeping with the methods used in previous analyses of these data (Kilian 1999). After excluding these cases, the total sample size in the database was n=14878. After running frequencies on all of the variables, exceptional values belonging to non-existent categories were found and excluded from the following variables: age (n=4), HIV status (n=4), marital status (n=6), education (n=11), occupation (n=15), and parity (n=1). The data for these variables were labeled as 'unknown/missing' and were given the value '99'. Exceptional values were found in the variables year and time (n=144). These were labeled '99' and a new time variable was created that excluded these missing values, from which a new 'year' variable was also created excluding these missing cases.

In the HIV status variable, the value '2' (undetermined), representing 0.6 % of the sample (n=92), was recoded to "undetermined/unknown/missing", in order to facilitate multivariate logistic regression with HIV status as a dichotomous dependent variable. The variable age (the only continuous variable in the dataset) was also recoded into an age group variable, with categories 15-19 yrs, 20-24 yrs, 25-29 yrs, 30-34 yrs, and 35+ yrs to facilitate bivariate analysis and logistic regression.

To account for the mix of sites included in the database over the years being studied, a new site variable was created in which early (1991-1994) and late

(1995-2004) periods were differentiated for urban, rural and semi-urban surveillance sites. This was necessary because in the semi-urban and rural areas, different sites were included in serosurveillance in these two periods. In order to conduct a uniform analysis over the three geographic strata, the urban site was also subdivided into early and late periods, although only one site, Fort Portal, was included in the urban data. This stratification was especially appropriate for the logistic regression portion of the analysis, in order to identify potentially different trends in HIV status in the two time periods due to different sites being used for surveillance. This new site variable was used in all subsequent analyses.

b) Univariate analysis

A univariate analysis (crosstabs) was then undertaken with HIV status as the outcome variable, in order to calculate crude HIV prevalence rates for the ANC population. HIV prevalence was computed with the numerator as the number of women with an HIV-1 seropositive status and the denominator as the number of women with a definite HIV-1 serostatus (either positive or negative). For this analysis, "unknown" values for the education (n=57, 0.4 %), age group (n=4, 0.0 %) and marital status (n=39, 0.3 %) were excluded as these were too few to have a significant effect on prevalence data. A three-way crosstab analysis was also done with site as the third variable, in order to show similarities and differences in prevalence rates between the three geographic strata. The statistical significance of the change in prevalence over time was evaluated using the Pearson chi-square test. In addition, the chi-square test was used for evaluating associations between HIV infection over time and other categorical variables such as marital status, age, occupation, parity and education.

Upon inspection of graphs of bivariate analyses of crude HIV prevalence over time, a large peak in HIV prevalence (between 30-40 %) was observed in the urban site over the years 2001-2002. This peak did not correspond to figures presented in BHS lab reports and annual reports, and is unrealistically high for this region. No concrete explanation could be found for this peak, and it is likely due to coding or data entry error. Therefore, all HIV test results for women attending Fort Portal ANCs in the years 2001 and 2002 (n=1220) were removed from subsequent analyses.

c) Univariate logistic regression

Next, a univariate logistic regression was run with HIV as a dependent variable with a dichotomous outcome, and site, time, occupation, marital status, education, age group and parity were examined separately as covariates. The purpose of this analysis was similar to the crosstabs performed earlier: to describe data and to form an idea of trends in risk of HIV within the categories of each variable. It was also used to determine which variables were significant, and to guide re-categorization of some variables for entry into a multivariate model. Additional reasons for performing a univariate analysis prior to building a multivariate model included describing the nature of the relationship of the variables to HIV status, in order to decide how to enter the variables into the model. For example, odds ratios for HIV risk were found to increase, then decrease as age groups increased. Due to this non-linear relationship between HIV risk and age, age could be entered as age*age (continuous variable) in a multivariate logistic regression model.

d) Multivariate logistic regression

Based on the results of the univariate analysis (see results section), a main multivariate model and two stratified models were developed with HIV as the dependent variable. The models were stratified by site and age group respectively. The purpose of this stratification was to identify possible differences in the relationship between variables of interest and HIV status between these strata, with particular attention paid to differences in the risk of HIV infection over time.

All undetermined/unknown/ missing/excluded values for HIV status were removed from the multivariate analysis (n=1312). A main multivariate model was created with HIV as the dependent variable, and six covariates: site, occupation, education, marital status, age group, and the continuous variable time. An interaction variable, site by time, was also entered into the model. Dummy variables were created for each discrete variable to be included in the model, with one fewer than the number of categories in the variable (for example, in the variable 'marital status', single status was coded as 0, married was coded as 1, and widowed/divorced was coded as 2).

Model-Building Strategy

The modelling strategy used to create the multivariate model can be described as ad hoc, but several guidelines informed the selection of variables to be included in the final model, with the aim of achieving a parsimonious, numerically stable model that could be easily generalized. Variable selection for the final multivariate model loosely followed steps outlined in Hosmer & Lemeshow (2000).

Step 1

Variable selection began with a univariate analysis of each variable, as described above.

Step 2

Next, a sequential multivariate logistic regression was performed, so that variables entered the model in a stepwise fashion, creating a collection of models which could be examined to check that each variable significantly predicted HIV. At this step, the criteria for inclusion of variables into the model were less stringent: p-values < 0.2 were used, as a smaller p-value could fail to identify variables known to be important (Hosmer & Lemeshow 2000). In comparing ORs derived from univariate regression, it was observed that the variables parity and age group showed similar trends in HIV risk between categories (increasing, then decreasing). Age group was judged to have more significance for the study, therefore parity was dropped from subsequent models.

Step 3

Following the fit of the multivariate model, goodness-of-fit tests were performed. This was done by assessing the significance of the variables in the model by using the likelihood ratios test to compare models with and without these variables. The equation for the log-likelihood test for a given variable is shown here (VAR=variable of interest; log-likelihood values were provided in SPSS):

$\chi2$ = 2 [(log-likelihood for model with VAR) – (log-likelihood for model without VAR)]

A non-significant chi-square indicates that the model excluding VAR was no better than the model with all predictors, therefore the variable VAR can be reliably excluded from subsequent models. The time variable was found to be non-significant at this step, but as time is the covariate of interest in this study, it was included in the final model.

Step 4

In this step, results from univariate analyses were examined to identify possible interactions between variables. In this case, site and time were selected (see results section for more details). An interaction term with these two variables multiplied together was created and added to the final model.

Step 5 - Assessing the adequacy and fit of the model

Before drawing inferences from the model, its adequacy and fit were checked using a contingency table of residuals from the Hosmer-Lemeshow goodness-of-fit test, which is the most reliable test of model fit in SPSS (Pallant 2004). The Hosmer-Lemeshow chi-square for the model including the time variable was 27.249, with a significance level of 0.001, and for the model excluding time the chi-square value was 20.482 with a significance of 0.009. The significant chi-squares suggest that the fit of the model was not good; this can be explained by a few larger differences between observed and expected values for HIV=1. When the residuals for HIV=0 and HIV=1 were plotted in a histogram in SPSS, they showed a relatively normal distribution, indicating that despite the results of the Hosmer-Lemeshow test, the model had an adequate fit.

The Final Model

The final model was run using direct logistic regression (all predictors entered the model simultaneously). The final multivariate logistic regression model can be expressed mathematically as:

Linear regression equation:

$$(\text{Odds of HIV}=1) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_1 \cdot X_4$$

Logistic regression equation:

$$\text{Log (odds of HIV=1)} = \frac{e^{\beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + \beta 7X1 * X4}}{1 + e^{\beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + \beta 7X1 * X4}}$$

where β_0 = regression constant

β_{1-7} = regression coefficients

X_1 = site

X_2 = marital status

X_3 = occupation

X_4 = time

X_5 = age group

X_6 = education

$X_1 \cdot X_4$ = site*time

Methods: Cross-sectional household surveys

2) Is the public in Fort Portal town aware of a declining trend in HIV prevalence and if so, how does it explain this trend?

To address this question, both quantitative and qualitative research methods were used. Firstly, a cross-sectional household survey (n=252) consisting of a semi-structured interview of mainly closed-ended questions was used, with the purpose of acquiring quantitative data from respondents regarding their demographic characteristics, knowledge and awareness of HIV/AIDS, and their opinions on HIV prevalence trends in Uganda, as well as how successfully the outcomes of HIV/AIDS interventions have been communicated to them.

Secondly, the qualitative component of this study consisted of eight focus group discussions (n=68). FGDs were conducted to validate and supplement findings from the household surveys. Accordingly, topics of discussion included awareness of and explanations for Uganda's HIV prevalence trends, interpretations of Uganda's HIV/AIDS "success story", and preferred methods of communication about AIDS control program outcomes. Issues raised during the household surveys were identified and incorporated into the discussions, in order to gain a more in-depth understanding of them. The group discussion format also allowed a fuller exploration of the topics through enhanced participation and information sharing amongst the participants (Kitzinger 1995).

Household survey description

The survey was developed by the principal investigator at the University of Alberta, and revised on arrival in Fort Portal with input from DHS Dr. G Kabagambe-Rugamba, Mr. Tom Rubaale, and research assistants Anna Kabagambe and Catherine Kemigabo. During this process, the questionnaire was altered to optimize clarity of questions, appropriateness of terminology, and sensitivity of issues. The final survey was 54 questions long (see Appendix C) and comprised three sections. Part A, Demographics, consisted of 11 questions regarding age, sex, marital status, housing type, income, religion, and education. Part B, Basic Knowledge on HIV/AIDS, consisted of 12 questions regarding knowledge of AIDS, its causes, symptoms, modes of transmission, prevention, and a self-assessment of the respondent's risk of contracting HIV. This section also included questions on the respondent's awareness of local AIDS control programs. Part C, Awareness of HIV Prevalence Trends, addressed the research question. This section included questions on HIV prevalence trends in Uganda and Fort Portal since 1990, and explanations for these trends. Questions on proxy measures of HIV prevalence, such as stigma and AIDS-related deaths, and observed changes in sexual behaviour were also included. Services such as VCT, PMTCT and anti-retroviral (ARV) drug treatment were investigated as to their role in HIV prevalence trends. There was particular interest in PMTCT and ARV treatment, as these are relative newcomers to the Kabarole District AIDS Control Program and the BHS team leader recommended their inclusion in the survey. Finally, this section included questions on awareness of and agreement with the Ugandan HIV/AIDS "Success Story", and satisfaction with how outcomes of HIV interventions have been communicated to the Ugandan public by the government. A small number of open-ended questions were incorporated into the questionnaire to collect data that was unsuitable for closed-question design due to the broad spectrum of answers that could result (e.g. reasons for satisfaction or dissatisfaction with information on HIV trends, reasons for considering oneself at risk of HIV infection or not).

Questionnaires were translated into the local language, Rutooro, and were tested for linguistic reliability by being translated back into English by a different translator. Both English versions were compared to identify differences, and if any were found they were corrected by consensus with all translators present. The language of the questionnaire was modified in this way until all questions were found to be simple and direct, and familiar to the target population. The information sheet and consent forms accompanying the survey underwent the same translation process.

Pretesting

The questionnaire was pre-tested in six households in two LC1s selected by the BHS Team Leader. The purpose of the pretest was to determine the comprehensiveness of the survey and its acceptability by the participants. The WHO's Expanded Program on Immunization (EPI) cluster sampling method (to be outlined in next section) was also pretested at this time. The pretesting participants were provided with an information letter, and informed consent (including the stipulation that this interview was for pretesting purposes only) was obtained from each respondent before pretesting the questionnaire (see Appendices E and F). Each research assistant conducted three pretest interviews. At the conclusion of each pretest, the research assistants were asked to comment on the questionnaire terminology, sequence of questions, and general concerns related to the interview process. Based on the results of the pretesting, minor revisions were made to the questionnaire: some questions were added, and redundant or confusing questions were removed or reworded. The primary investigator was present during all pretests, and provided feedback and constructive criticism to the research assistants regarding their interviewing skills and techniques. The pretest interviews were not included in the analysis of the household survey data.

Sample size/selection

Using the formula for cluster sampling developed by Kumar & Indrayan (2002) (see below), the number of clusters needed to obtain a precision of +/- 10 with 95% confidence was 27. The WHO recommends using a design effect of 2 to achieve the same precision with cluster sampling as would be possible with simple random sampling (Lemeshow & Robinson 1985). In this study, a design effect of 2.5 was used. See Appendix D for the full calculation using WHO guidelines.

$$C = \frac{P(1-P)D}{B} \times \frac{Z^2_{1-\alpha}}{L^2}$$

C= number of clusters

P = anticipated prevalence rate (rate of a particular answer to a specific question)

D = design effect

α= size of the critical region (1 - α is the confidence level)

$Z_{1-\alpha}$= standard normal deviate corresponding to the specified α

L = precision required

B = cluster size

Based on 27 clusters of 7 subjects each, a desired sample size of 192 was calculated. Since for logistical and convenience reasons a non-random sampling method was used for selecting subjects within clusters, the actual number of clusters used in this study was 36, for a total sample size of 252, which meets the requirements discussed above.

The smallest administrative unit in Uganda is the level-one local council (LC1) which is essentially the same as a village, with each one having an average area of a few square kilometres. Therefore, the LC1 was chosen to represent one cluster in our sampling method. In order to select LC1s for data collection, a comprehensive list of all 93 LC1s in Fort Portal Municipality was obtained. Numbers were assigned to each LC1, and the LC1s were randomly reordered using Microsoft Excel. The first 36 LC1s on the list were chosen to be visited. Seven households in each LC1 were to be visited for data collection.

The principal investigator travelled to the sample sites along with two research assistants fluent in Rutooro. On arrival at the selected LC1, the Local Council Chairman (village leader) was sought. The researchers introduced themselves to the LC1 Chairman, explained the study to him/her and provided him/her with a copy of the information letter accompanying the survey, along with contact information for the researcher. The LC1 then provided verbal consent for data collection in his/her village. Typically a small remuneration (not more than $5 CDN) was given to the chairman in thanks for his/her cooperation.

EPI Cluster Sampling Method

This cluster sampling technique was used because it is the most feasible method in low-resource environments such as Fort Portal. The households to be visited for the cross-sectional survey were selected using the 30-cluster, seven-persons/cluster random sampling method originally developed by the World Health Organization for baseline data collection about immunization coverage and for measuring program effectiveness (Hoshaw-Woodard 2001). In consideration for the study location and circumstances, LC1s were used as cluster units, with seven households within each cluster used to collect data. A simple random sampling technique could not be used because a full list of households in Fort Portal was not obtainable. With assistance from the LC1 chairman, the researchers identified the central point in the LC1. This was usually a school, place of worship, or a trading centre. The researchers stood at the central location and threw a pen into the air, observing the direction in which the pen's tip was pointing when it hit the ground. The first house that lay in that direction would be the first household visited for the survey. If no house lay in the direction the pen was pointing, the procedure would be repeated until a first household was indicated. Every attempt was made to visit seven adjacent households lying in a straight line in the direction indicated by the pen's tip. However, this was not always possible, due to natural obstacles (such as rivers or fences), or no one being present at the selected house. In these cases, the closest neighbouring house (defined by the closest front door) was chosen.

Inclusion criteria

Only respondents over the age of 18 years were included in the study. Efforts were made to include equal numbers of males and females meeting the study inclusion criteria, therefore research assistants were instructed to attempt to alternate males and females in each successive household. This was a challenge as data collection took place during the day, at a time when most men are out working and women are more likely to be at home doing housework. The final female:male ratio was 60:40.

Data Collection

Surveys were administered during face-to-face interviews in the homes of respondents. Interviews were conducted in as private and comfortable a place as possible, with every effort made to provide the respondent with a familiar environment where they would feel at ease. Informed consent was sought from all study participants prior to the interview. For this purpose, a written information letter outlining the purposes and implications of the study and clarifying the voluntary nature of their participation was provided or read, and agreed to either by signing or thumbprinting the consent form prior to commencing the interview (see Appendices E and F). For reasons of confidentiality, no names of interviewees were recorded, and only socio-demographic information was requested. In the interest of efficiency and time limitations, interviews did not last longer than 30-45 minutes and did not diverge greatly from the topic of discussion. Interviews were conducted either in English or in Rutooro, although the vast majority of subjects did not speak English, so the language most often used was Rutooro. During the interview, potentially confusing terms such as "stigma" and the 'ABC' strategy for AIDS control were explained to the respondents, and probing was used as required to clarify responses and to elicit more depth and meaning. Responses were recorded in pen by the researchers on the questionnaire sheet during the interview. Interviews were considered complete following respondents' answer to the last question or respondents' decision to terminate the interview, whichever came first.

The existence of language barriers was a complicating factor in the data collection phase of this investigation, as the vast majority of Kabarole residents are unable to communicate in English and the primary investigator was unfamiliar with the Rutooro language. As a result, the research assistants undertook the data collection for most household surveys in Rutooro.

Data Verification

Immediately after each interview, the researchers elaborated on notes taken during the interview so as to capture all relevant thoughts or views of respondents. At the end of each interviewing day, regardless of whether the primary investigator was present at the interviews or not, the completed questionnaires were examined by the primary investigator and the research assistant together, so that the primary investigator could understand and interpret respondents' answers for data entry. If necessary, the research assistant provided definitions or clarifications of culturally specific or ambiguous language used in responses.

Data Analysis

The primary investigator assumed sole responsibility for data entry into Microsoft Access. An Access spreadsheet was created in which categorical and open-ended questions were entered. A data codebook was also created in Microsoft Word to assist with the transformation of data from the questionnaire into SPSS14.0. Data entry for the closed-ended questions proceeded according to the codes specified for each question. The qualitative information derived from open-ended questions was broadly categorized and coded into Access to permit analysis of these questions. The Access spreadsheet was then converted to Excel and exported to SPSS14.0 for analysis.

Descriptive statistics (frequencies) of the data were generated for the entire sample, and for males and females separately, to identify any similarities and differences in responses between genders. Univariate analysis (crosstabs) was undertaken to highlight differences between genders or socioeconomic levels for some responses, as well as to link selected sociodemographic variables with knowledge of HIV/AIDS, HIV prevalence trends, and perceptions of HIV trends.

Methods: Focus Group Discussions (FGDs)

FGD Questions

FGD questions were developed using insights gained from the household surveys, and comments and themes that were cited frequently by survey respondents were taken into consideration in FGDs. It was thought that FGDs could be useful in estimating the degree of consensus among the public regarding their awareness of HIV prevalence trends. A funnel method was used in developing questions, beginning with general questions which led to more specific discussion in order to achieve a balance between obtaining information that suited the researcher's interests and allowing the respondents to influence the flow of discussion. Each group was asked a common set of questions regarding Uganda's HIV trends, its HIV/AIDS "Success Story" and reasons for HIV trends (see Appendix G). Additional questions relevant to each FGD group were also asked.

Sample Size/Selection

FGD groups were chosen based on their potential to provide insightful thoughts, comments and opinions on HIV prevalence. A well-rounded perspective on HIV prevalence trends was sought, therefore the FGD participants came from a broad range of backgrounds and ages. Participant groups were also chosen for convenience reasons, as some groups were known to the research assistants or the BHS Team Leader. These groups were assembled by purposive sampling by the research assistants, who had special knowledge about or acquaintance with specific groups, and by T. Rubaale (Team Leader, BHS). Subjects were selected from four groups of key informants: a) professionals (working in areas of civil service, education, police etc.) b) citizens of "middle" socioeconomic status c) "allopathic" health professionals d) traditional healers e) youth f) the West Post Test Club of Fort Portal (a group for HIV positive people). Eight FGDs were conducted in all, with an average of 7-12participants each, totalling 68 participants:

Group	Male	Female
Traditional Healers	8	4
West Post Test Club	2	6
Youth (2 FGDs)	8	7
Health Professionals	8	1
Other professionals	3	5
Fort Portal residents (2 FGDs)	8	8

Inclusion criteria

As with the household surveys, all FGD participants were aged 18 yrs or older.

Gender balance

Efforts were made to include an equal number of males and females in the discussions. To maximize participant comfort and ease of discussion, it was decided on recommendation by the BHS Team Leader to separate FGD groups by gender for youth and for citizens of middle socioeconomic status.

Data Collection

The eight FGDs were conducted by the principal researcher and two research assistants fluent in Rutooro. The site used for six of the eight FGDs was a conference room located at Basic Health Services. The site used for the remaining two FGDs (middle-class citizens) was a private home near where the participants lived. These sites were chosen for their neutrality, ease of access by participants, and private, quiet atmosphere conducive to discussion. During FGDs, participants were seated in a circular formation, with the audio recording devices placed on a chair or table in the centre of the circle. All FGDs were audio taped using both digital and analog tape-recorders, with additional tapes on-site.

In addition, a research assistant manually recorded notes during each FGD. Before each FGD, individual consent was sought from participants, using information and consent forms similar to those used for the household surveys (see Appendices E & F). Before beginning the discussion, it was ensured that the FGD participants understood that their statements were to be audio taped, and that, as this was a group discussion, their comments could not be guaranteed to be held confidential by the other discussion participants. FGDs began with self-introductions by the researchers and the participants, with each stating their name and giving a brief background on themselves. The establishment of group norms and the need for confidentiality and respectful conduct towards other participants followed, and at this point any questions about the FGD process were addressed. The facilitator then introduced the main themes to be discussed and the purpose of the discussion. Following this, the participants were asked to discuss the given themes. Probing was used throughout to encourage participants to elaborate in order to follow up on statements and to achieve a suitable depth of knowledge and insight. FGDs ranged from 45-90 minutes in duration depending on the dynamics of the group, with flexibility allowed for more or less discussion. The researcher took "running notes" whenever possible on group dynamics during the discussion (Rothe 2000). After the FGD topics had been exhausted, participants were given the opportunity to ask any questions they wanted about the FGD topics or similar related topics. This proved a useful exercise as it further elaborated on areas of interest to the participants, and their impressions of the FGD.

At the end of the FGD, subjects were thanked for their participation and contributions to the discussion. As remuneration for participants' mobilization and time taken to participate in the discussion, sodas and snacks were provided at the conclusion of the discussion, and a small stipend (around Ugsh 5000) was provided to each participant. FGDs were dismissed with the understanding that participants could contact the researcher or the research assistants at any time for further information.

FGD Transcription

Transcription of FGDs took place as soon as possible after completion of the FGD. When the FGDs were conducted in English, the principal researcher completed the transcription. As most group discussions took place in Rutooro, the primary investigator worked with a translator who transcribed a verbatim account of the group discussions directly into English.

Data Verification

Data for FGDs were verified in several ways. First, probing and verification questions were used during discussions to ensure that FGD participants' words and meanings were understood correctly. For example, a verification question could consist of the researcher repeating a participant's comment back to him/her in the form of a question requiring a yes/no answer. This kind of probing helped to clarify participants' opinions or attitudes on the issues being discussed. Secondly, the audio recordings and the notes taken during the FGDs were cross-checked against one another to fill in gaps in the discussion. Finally, during transcription any culture-specific wording and meanings were defined and explained to the primary investigator by the transcriber.

Data Analysis

Data analysis of FGDs followed guidelines set out by Rothe (2000). After transcription, an overall reading and surface analysis of the transcript was completed. During this first reading, general themes and possible subthemes were identified. Following this initial reading, themes and subthemes were arranged into groups whereby related concepts were placed together under overarching themes. Codes were assigned for each theme and subtheme. The transcriptions were then organized into word tables by question and response sets. Each statement or thought within a statement was put on a separate line of the table and was assigned a theme and subtheme(s); statements could contain up to a maximum of two themes and subthemes. The coded statements were then divided up according to theme of answer, group and gender responses to each question.

Frequency of responses for each applicable question were obtained, as well as frequency of themes given in responses. Comparisons were made among the data obtained from male/female focus groups, and among the different age and occupational groups represented in the FGDs.

Chapter 3 - Results

Results of the ANC database analysis

1) Descriptive Statistics (Frequencies)

Table 1 provides a detailed summary of frequencies for all variables of interest in the database.

Table 1: Characteristics of ANC population

Variable		n=14878	%	% HIV positive
Site[1]				
	Early Rural	907	6.1	7.1
	Late Rural	2769	18.6	7.2
	Early Semi-urban	1079	7.3	15.6
	Late Semi-urban	2546	17.1	11.4
	Early Urban	1757	11.9	22.1
	Late Urban	5676	38.5	19.0
Education				
	Unalphabetic	5589	37.6	11.6
	Less than primary	3019	20.3	12.8
	Primary	4892	32.9	20.1
	Secondary/Tertiary	1321	8.9	19.7
Age in years[2]				
	15-19	4010	27.0	13.0
	20-24	4916	33.0	16.3
	25-29	2910	19.6	18.0
	30-34	1885	12.7	15.4
	35+	1153	7.7	10.7
Occupation				
	Farmer/peasant	9236	62.1	13.6
	Business owner	893	6.0	23.4
	Others (inc. servant, student)	2836	19.1	20.2
	Unknown/missing	1913	12.9	12.5
Year				
	1991	619	4.2	15.7
	1992	800	5.4	15.9

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[1] Early Urban site=Fort Portal, 1991-1994. Late Urban site=Fort Portal, 1995-2004. Early rural site=Nyabbani, Rukunyu and Kasule, 1991-1994. Late rural site=Nyabbani, 1995-2004. Early semi-urban site=Rwimi and Kyegegwa, 1991-1994. Late semi-urban site=Rwimi, 1995-2004. It is impossible to distinguish between sites within geographic strata in the database (only 3 codes were used: urban, semi-urban and rural). Information on specific sites and time periods comes from annual program reports and laboratory reports obtained from Basic Health Services, Fort Portal.

[2] Women over the age of 58 years were not included in the analyses.

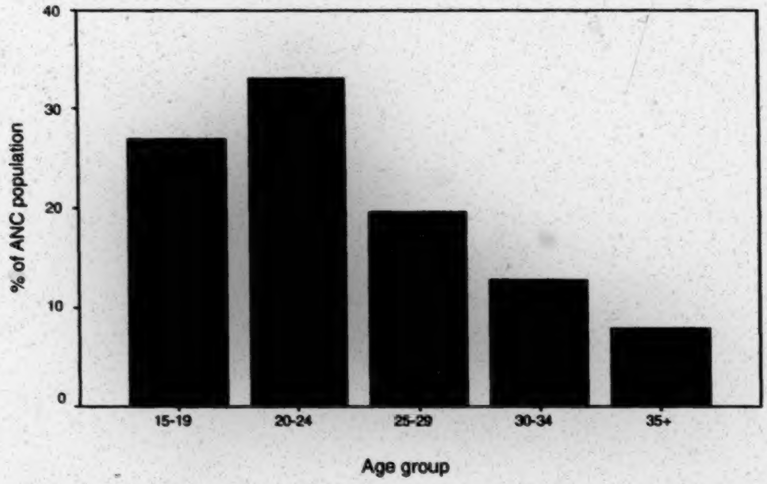
Table 1: Characteristics of ANC population

Variable		n=14878	%	% HIV positive
	1993	1251	8.4	18.1
	1994	1073	7.2	15.8
	1995	1094	7.4	16.3
	1996	728	4.9	16.8
	1997	835	5.6	14.3
	1998	529	3.6	19.8
	1999	1131	7.6	14.3
	2000	1760	11.8	14.1
	2001	1777	11.9	10.0
	2002	982	6.6	7.6
	2003	982	6.6	12.5
	2004	1173	7.9	11.9
Marital status				
	Single	3068	20.6	16.3
	Married	11650	78.3	14.8
	Widowed/divorced	121	0.8	17.2
Parity				
	0	2922	19.6	12.3
	1-2	4840	32.5	17.4
	3-5	4163	28.0	15.4
	6-9	1578	10.6	11.2
	10-16	178	1.2	9.3

Age

The mean age of women in the sample was 24 years (15-58 years, interquartile range 9). The largest age group represented in the sample was 20-24 years (n=4916, 33.0 %). Although they were excluded for analysis purposes, the 134 ANC attenders in the database who were below the age of 15 years could be an indication of a low age at first sex in Kabarole District.

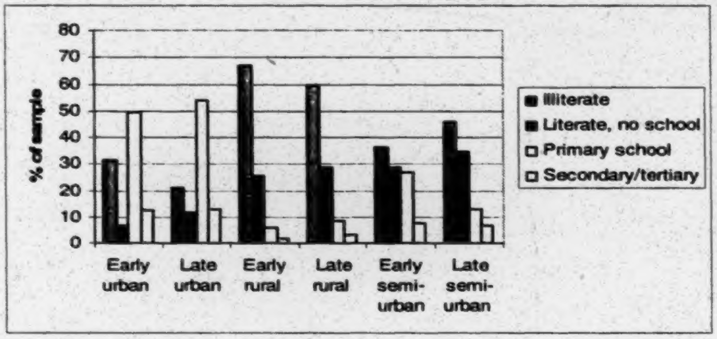
Figure 1: Age distribution of ANC population



Education

The frequencies indicate that there was a relatively low level of education among the women. The majority of ANC attenders had less than a primary education in the semi-urban (n=2744, 75.8 %) and rural sites (n=3280, 89.3 %), whereas in the urban site, n=4945 (65.7 %) had a primary school education or higher.

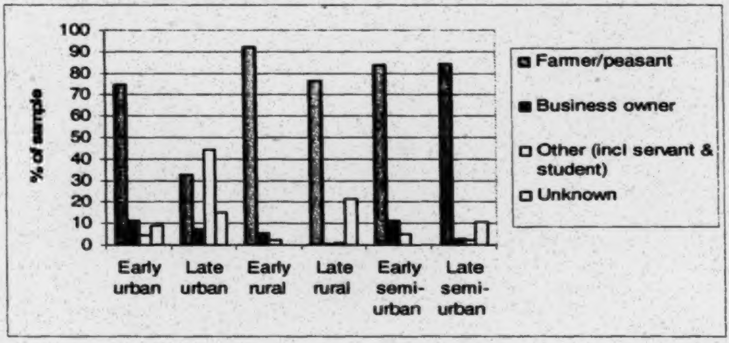
Figure 2: Education levels of ANC population (n=14821)



Occupation

The predominant occupation in all three sites was peasant farming. Not surprisingly, relatively higher proportions of ANC attenders in semi-urban and rural areas made their livings as peasant farmers, and most business owners, servants and students were concentrated in the urban site.

Figure 3: Occupations of ANC population (n=14878)



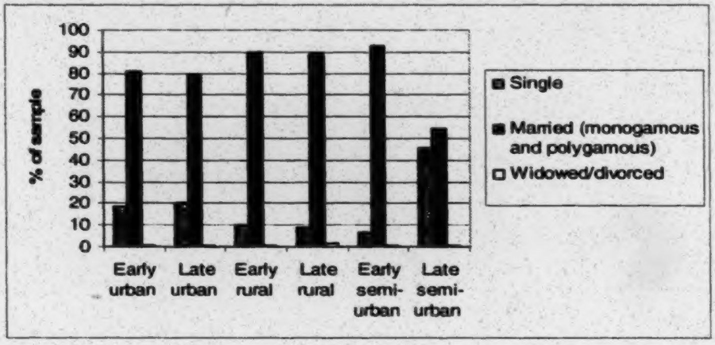
Parity

Women in the sample had a mean of 3.0 children (median 2.0), ranging from 0 (first pregnancy) to 16 (17th pregnancy).

Marital status

The distribution of single vs married women was remarkably similar in all sites, with proportionally more single women in the urban site. A notable exception was the late semi-urban site, which contained comparable numbers of single and married women.

Figure 4: Marital status of ANC population (n=14839)



2) Univariate analysis: Crude HIV prevalence

Crosstabs were performed with HIV as the dependent variable, using the Pearson chi-square. **Table 2** shows the crude HIV prevalence and p-values for the overall sample and stratified by site, for each of the variables in the database.

Table 2: HIV positive in ANC population[3]

		Early urban	Late urban	Early semi urban	Late semi urban	Early rural	Late rural	All
Variable		%	%	%	%	%	%	%
HIV status								
	Positive	22.1	19.0	15.6	11.4	7.1	7.2	15.2
p-value								<0.001
Education								
	Unalphabetic	18.8	18.6	9.6	10.0	6.8	7.1	11.6
	Less than primary	21.7	18.3	16.8	12.3	6.1	7.5	12.8
	Primary school	22.5	20.0	20.5	13.1	11.3	6.2	20.1
	Secondary/university	29.4	16.8	21.7	12.6	17.6	8.5	19.7
p-value		0.017	0.325	<0.001	0.254	0.187	0.868	<0.001
Age group								
	15-19	21.6	11.9	16.5	9.7	9.3	5.7	13.0
	20-24	27.9	22.5	17.1	10.3	6.3	5.9	16.3
	25-29	24.9	25.9	14.6	13.8	8.5	8.2	18.0
	30-34	12.7	20.9	12.9	16.2	5.5	10.3	15.4
	35+	9.8	12.1	13.0	8.9	3.0	7.5	10.7
p-value		<0.001	<0.001	0.725	0.006	0.320	0.027	<0.001
Occupation								
	Farmer/peasant	22.0	19.8	14.8	11.0	6.7	7.9	13.6
	Business owner	28.5	25.8	17.1	14.7	12.0	25.0	23.4
	Others	21.5	18.4	26.4	19.6	10.0	8.6	20.2
	Unknown/missing	16.0	17.2	0.0	11.9		4.1	12.5
p-value		0.042	0.006	0.123	0.215	0.317	<0.001	<0.001
Parity								
	0	24.5	13.7	13.2	10.5	7.7	7.1	12.3
	1-2	27.7	23.0	15.0	11.7	7.9	5.8	17.4
	3-5	17.2	22.6	13.6	12.7	6.6	7.3	15.4
	6-9	10.7	12.6	11.6	8.9	4.3	12.7	11.2
	10-16	7.7	3.4	11.5	11.6	6.7	10.0	9.3
p-value		<0.001	<0.001	0.907	0.382	0.742	0.008	<0.001
Year								
	1991	22.9		13.6		8.7		15.7
	1992	20.0		13.1		9.0		15.9
	1993	23.7		16.6		7.8		18.1
	1994	21.6		17.1		3.8		15.8
	1995		18.4		19.9		8.1	16.3
	1996		21.0		10.3		5.2	16.8
	1997		16.7		11.7		5.5	14.3
	1998		21.1				12.0	19.8
	1999		20.2		8.9		10.1	14.3
	2000		20.3		10.4		7.3	14.1
	2001				10.6		9.0	10.0
	2002				8.5		4.9	7.6
	2003		18.7		11.4		3.6	12.5
	2004		16.4				5.0	11.9
p-value		0.554	0.251	0.494	<0.001	0.103	0.009	<0.001
Time	1991 Fall	22.9		13.6		8.7		15.7
	1992 Spring	24.0		12.2		9.2		16.4
	1992 Fall	18.0		14.0		8.8		15.5
	1993 Spring	23.5		15.2		9.4		18.8
	1993 Fall	23.9		19.5		6.8		17.2
	1994 Spring	23.9		16.7		5.0		16.9
	1994 Fall	19.1		17.8		2.5		14.5
	1995 Spring		17.9		22.3		9.5	17.8
	1995 Fall		18.8		11.4		6.7	14.2
	1996 Spring		19.4		10.3		6.8	15.1
	1996 Fall		22.6				3.5	19.0
	1997 Spring		14.9		10.5		7.1	12.8
	1997 Fall		18.5		13.0		3.7	15.8
	1998 Spring		23.9				12.0	20.8
	1998 Fall		18.8				8.9	18.8
	1999 Spring		18.5		9.0		11.2	13.3
	1999 Fall		22.0		8.8		8.6	15.2
	2000 Spring		21.9		8.8		6.1	15.5
	2000 Fall		18.7		11.3		7.3	12.9

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[3] Early Urban site=Fort Portal, 1991-1994. Late Urban site=Fort Portal, 1995-2004. Early rural site=Nyabbani, Rukunyu and Kasule, 1991-1994. Late rural site=Nyabbani, 1995-2004. Early semi-urban site=Rwimi and Kyegegwa, 1991-1994. Late semi-urban site=Rwimi, 1995-2004.

Table 2: HIV positive in ANC population[3]

		Early urban	Late urban	Early semi urban	Late semi urban	Early rural	Late rural	All
Variable		%	%	%	%	%	%	%
	2001 Spring				9.9		10.2	9.0
	2001 Fall				11.6		4.9	10.9
	2002 Spring				11.7			11.7
	2002 Fall				3.4		4.9	9.0
	2003 Fall		18.7		11.4		3.6	12.5
	2004 Spring		16.0				4.4	11.1
	2004 Fall		16.8				6.1	13.1
p-value		0.463	0.357	0.725	<0.001	0.273	0.040	<0.001
Marital status								
	Single	29.2	20.6	22.7	10.5	7.7	7.9	16.3
	Married (mono/poly)	20.7	18.6	15.1	11.9	6.9	7.0	14.8
	Widowed/divorced	0.0	29.4	0.0	33.3	33.3	11.1	17.2
p-value		0.001	0.233	0.151	0.057	0.197	0.454	0.130

Site

Overall prevalence for women in the three sites was 15.2 %. The highest proportion of HIV-positive women came from the early and late urban sites (22.1 % and 19 %), followed by the semi urban sites (early semi-urban: n=168, 15.6 % and late semi-urban: n=290, 11.4 %) and then the rural sites (early rural: n=64, 7.1 % and late rural: n=199, 7.2 %).

Education

A higher prevalence of infection was found with increasing education levels. In all sites during the period 1991-1994, HIV prevalence rose with education level, peaking with secondary/tertiary education. However, in the period 1995-2004 the peak shifted to the primary school level, and those with higher education showed a lowered HIV prevalence. This was true in the late urban and late semi-urban sites, but not the late rural site. In the overall sample, the education level with the highest proportion of positives was primary school (n=841, 20.1%), followed by those with a secondary/university education (n=220, 19.7%) and then by those who were literate but had never attended school (n=374, 12.8%). This is in contrast to the relatively low prevalence in the illiterate group (n=615, 11.6%).

Age group

In the overall sample, HIV prevalence increased up to the 25-29 yr age group (n=474, 18.0%), then declined through to the 35+ yrs group. This trend was also true in the late urban site when it was analyzed individually, but in the late semi-urban and late rural sites prevalence increased all the way up to the 30-34 yr age group before falling off. The increasing HIV prevalence in older women is likely due to a cohort effect, but the results seen in the semi-urban and rural sites could also indicate that HIV infection has affected older women more severely in these areas.

Parity

In general, prevalence trends for parity showed the same characteristics as those for age group. Prevalence was highest in the group having 1-2 children (n=756, 17.4%), showing a decrease with increasing parity after this point. The exception to this was in the late rural site, where prevalence increased up to the 6-9 children group, and in the late semi-urban site where prevalence increased up until the 3-5 children group; this agrees with the observed increase in prevalence with increasing age in these two sites, as women with more children tend to be older.

Occupation

In the overall sample, business owners showed the highest HIV prevalence (n=183, 23.4%). ANC attendees who had reported other occupations (including students and servants) also had a high prevalence (n=475, 20.2%), while peasant farmers had the lowest prevalence at 13.6% (n=1165). This trend was also seen in all individual sites except the 2 semi-urban sites, where "other" occupations showed the highest prevalence.

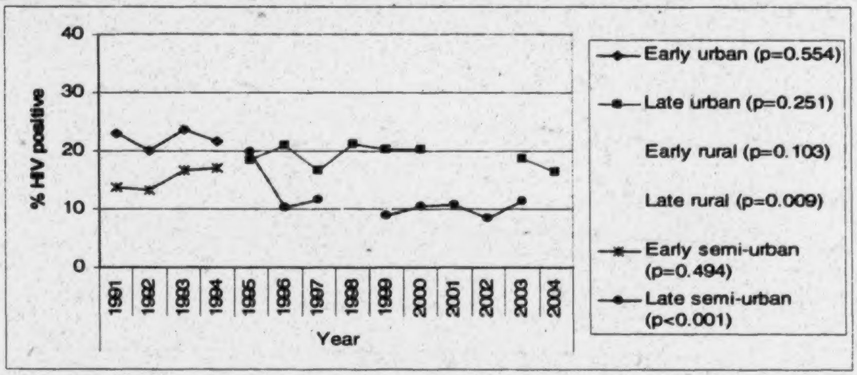
Marital Status

Single and widowed/divorced women had the highest prevalence overall (n=457, 16.3% and n=17, 17.2% respectively), while married women (in both monogamous and polygamous relationships) had a lower prevalence (n=1578, 14.8%). In all sites except early semi-urban, widowed and divorced women had the highest prevalence; this makes sense as women of childbearing age who are widows are more likely to have lost their husbands to AIDS.

Temporal trends in HIV prevalence

Crude HIV prevalence declined significantly (based on chi-square values) over time in most sites over the period 1991-2004. The decline was greatest in the late semi-urban site, with a decline in HIV prevalence from 19.9 % in 1995 to 11.4 % in 2004. A strong decline was also noted in the urban site (from 22.9 % in 1991 to 16.4 % in 2004). In the late rural site, it declined from 8.1 % in 1995 to 5.0 % in 2004. The lower overall levels of HIV in the rural site can explain the relatively small decline. An exception to the declines was the insignificant increase in prevalence over time in the early semi-urban site; in contrast, a dramatic drop in HIV prevalence was seen in the early rural site: the prevalence changed from 8.7 % in 1991 to 3.8 % in 1994.

Figure 5: Crude HIV prevalence trends in Kabarole District, 1991-2004[4]



Age group

A consistent decline in crude HIV prevalence over time was noted in women under 25 years of age. This decline was even stronger in the age group 15-19 years and was evident in all three geographic strata, although it was statistically significant ($p<0.05$) only in the early urban and late semi-urban sites. In contrast, older women (25 years and older) showed an increase in prevalence over time in the urban stratum and only slight declines in the semi-urban and rural strata.

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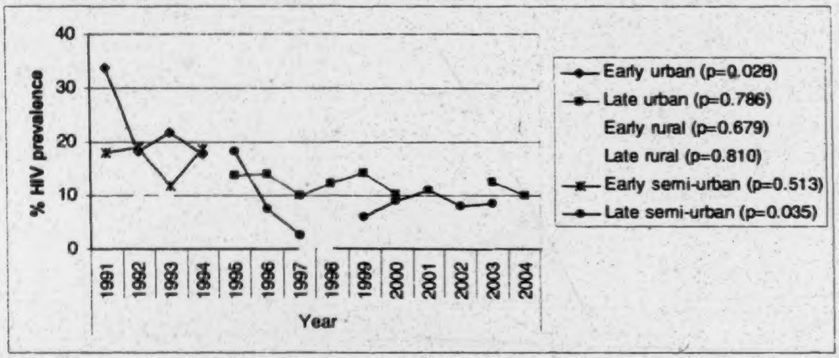
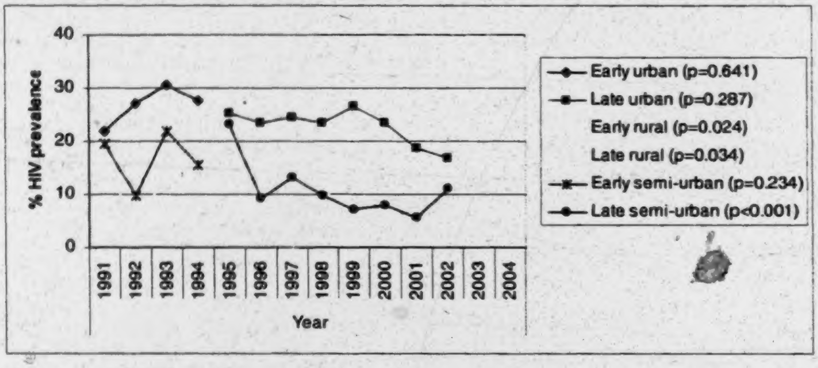
[4] HIV status data for 2001-2002 in the urban site (n=1220) were removed from the dataset due to believed inaccuracies in data entry and/or coding. No samples were collected in the late semi urban site in 1998.

Figure 6: HIV prevalence trends, 15-19 years, Kabarole District 1991-2004



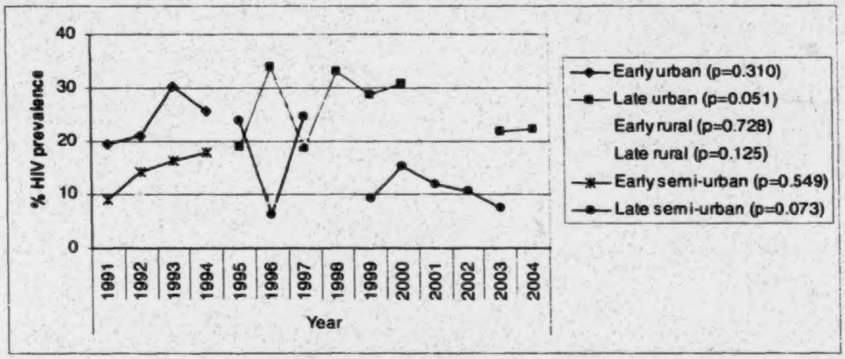
The decline in crude HIV prevalence in the age group 20-24 years, the group with the highest overall prevalence, was more apparent in the period 1995-2004. There was a significant decline in the rural sites in both periods, and the late semi-urban site; however, these declines were less pronounced overall than those of the 15-19 year age group.

Figure 7: HIV prevalence trends, 20-24 years, Kabarole District 1991-2004



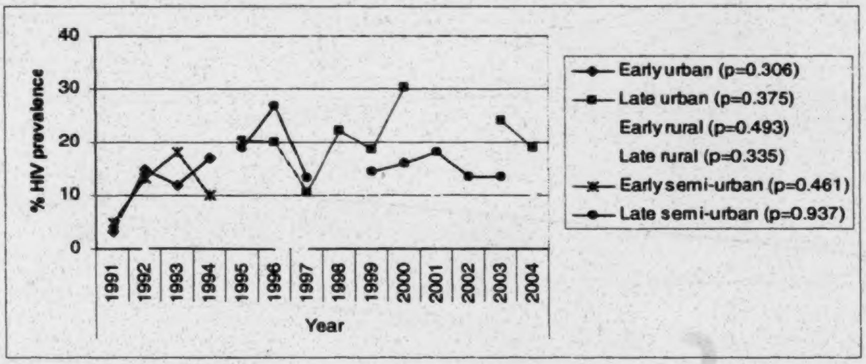
For the age group 25-29 years, no clear trend could be seen in any of the three sites, although the slight increase in prevalence in the late urban site, as well as the decrease in the late semi-urban site, were significant.

Figure 8: HIV prevalence trends, 25-29 years, Kabarole District 1991-2004



Trends in the 30-34 year age group were opposite to those in the 15-19 year group. Between 1991-1994, HIV prevalence appears to have increased in all 3 geographic strata, although in the later period (1995-2004) there is a slight decrease. None of these trends were statistically significant. The small sample size in this age group could also account for the high level of fluctuation in HIV prevalence from year to year.

Figure 9: HIV prevalence trends, 30-34 years, Kabarole District 1991-2004

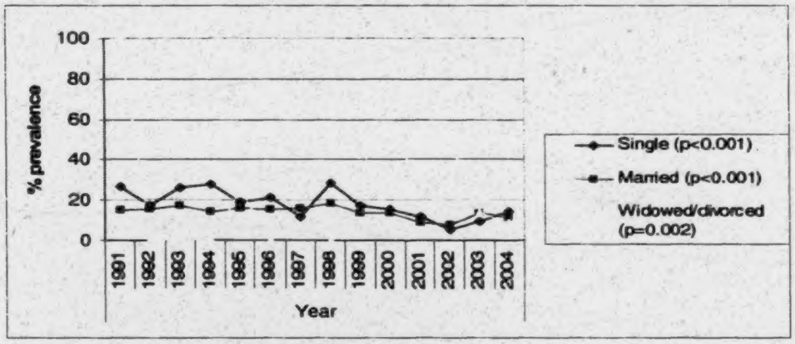


Finally, women in the 35+ years age group showed no clear trend in HIV prevalence over time. This could be attributed as well to the small sample size in this group.

Marital status

HIV prevalence trends were stratified by marital status, showing that single women's HIV prevalence declined significantly between 1991 and 2004 ($p<0.001$); this is probably linked with the declining prevalence among younger women, although the increase in single ANC attenders in the 15-19 year age group indicates that teenage pregnancies are still occurring. It should be noted that in the 15-19 year age group HIV prevalence trends declined similarly over time for both single and married women (see Appendix H). The HIV prevalence of married women in the overall sample also declined over time, but less so.

Figure 10: HIV prevalence trends by marital status, Kabarole District 1991-2004*

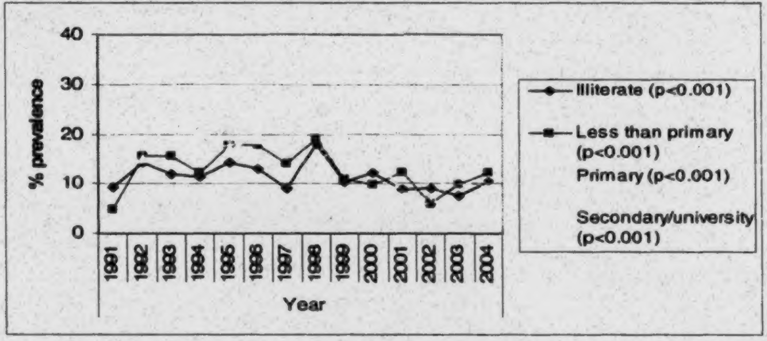


*Note: the number of divorced/widowed women in the sample is very small; this explains the high HIV prevalence seen in this group in certain years.

Education

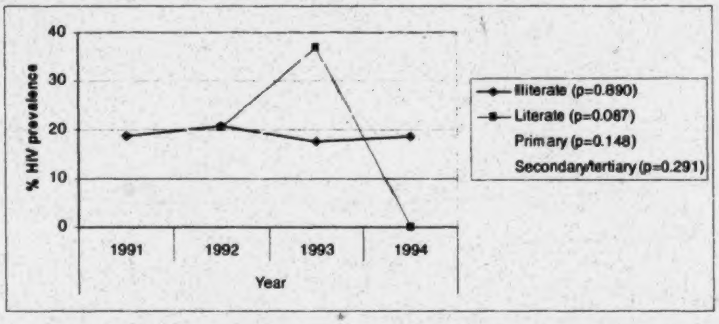
Trends in HIV prevalence over time in relation to education level were also examined using bivariate analysis. This showed an overall increase or stagnation in HIV prevalence over time in both illiterate women and women with a general education (less than primary school). This was in contrast to the relatively stagnant HIV prevalence among illiterate women. Among women with higher education levels (primary school, and secondary/tertiary education), HIV prevalence declined significantly over time, although HIV prevalence in those with a primary school education appeared to rise again after 2002.

Figure 11: HIV prevalence trends stratified by education level, all sites



The HIV trends by educational level were then examined at each of the five sites. In all sites except for late rural, HIV prevalence remained stagnant, increased or showed no clear trend in women with low education levels (illiterate women, and women who were literate but had not attended school). In contrast, a decrease in HIV with higher levels of education (primary, secondary or tertiary) was seen in all sites;

Figure 12: HIV prevalence trends by education level, early urban site



The education level with the greatest decline in HIV prevalence was the secondary/tertiary group, although none of the groups showed a statistically significant decline in the late urban site.

Figure 13: HIV prevalence trends by education level, late urban site

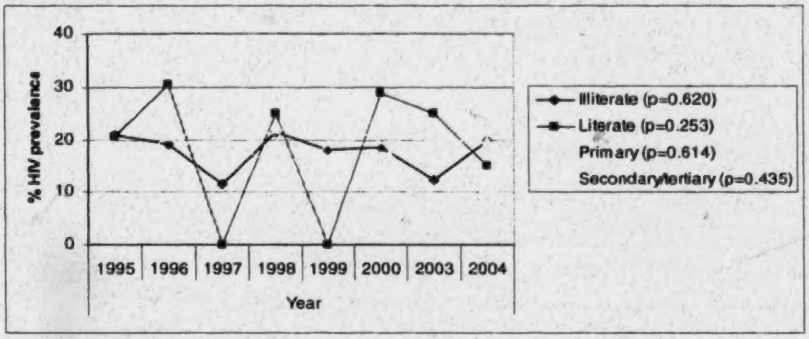
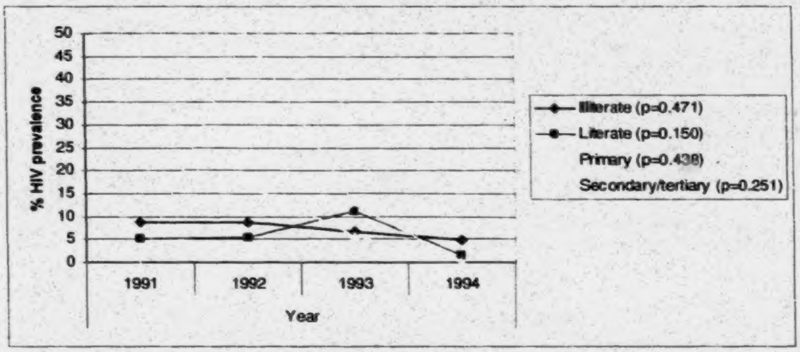


Figure 14: HIV trends by education level, early rural site



In the late rural site only, literate but unschooled women showed a significant decrease in HIV prevalence.

Figure 15: HIV trends by education level, late rural site

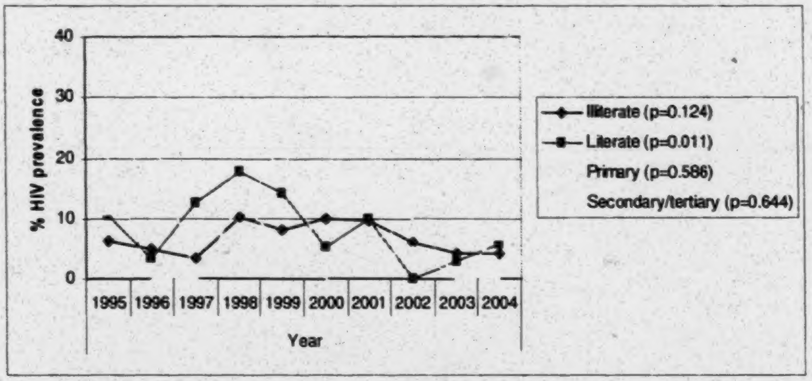
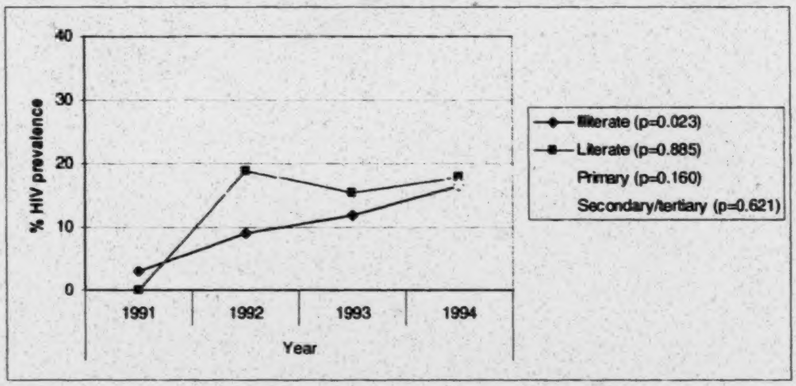
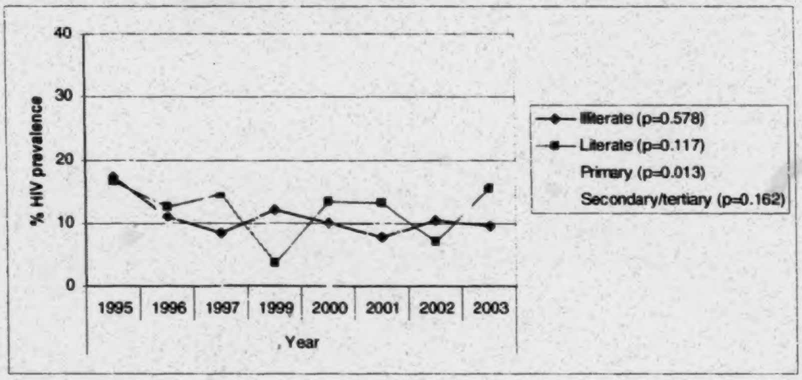


Figure 16: HIV trends by education level, early semi urban site



In women with primary education the decrease in unadjusted HIV prevalence was statistically significant in the late semi-urban site, although women with secondary or tertiary education also showed a decrease.

Figure 17: HIV trends by education level, late semi urban site



3) Univariate Logistic Regression

Univariate analysis: overall sample

A univariate logistic regression was performed on all variables of interest (site, time, education, occupation, marital status, age group) in order to further describe the ANC data, showing the predictive value of each variable on the likelihood of being HIV positive. This analysis identified significant relationships between independent variables and HIV status. Following a preliminary univariate analysis, categories within the variables age group, education, occupation and marital status were collapsed to minimize insignificant results and to facilitate multivariate regression. The results of this analysis are summarized in **Table 3**, along with a multivariate model of the overall sample.

Table 3: Univariate and Multivariate Logistic Regression
Odds ratio (OR) and 95 % confidence interval (CI)

	Univariate Analysis		Multivariate Analysis	
Variable	**OR (95 % CI)**	**p-value**	**OR (95 % CI)**	**p-value**
Site[5]				
Early Urban	1.00 (Reference)		1.00 (Reference)	
Late Urban	0.83 (0.72-0.95)	0.006	0.86 (0.53-1.39)	0.528
Early Rural	0.27 (0.20-0.35)	<0.001	0.62 (0.27-1.40)	0.246
Late Rural	0.27 (0.23-0.33)	<0.001	0.57 (0.29-1.14)	0.112
Early Semi-urban	0.65 (0.53-0.79)	<0.001	0.43 (0.22-0.84)	0.013
Late Semi-urban	0.45 (0.38-0.54)	<0.001	1.00 (0.55-1.81)	0.992
Time (continuous)	0.96 (0.95-0.97)	<0.001	0.996 (0.88-1.13)	0.949
Site*Time				
Late Urban*Time			1.00 (0.88-1.14)	0.965
Early Rural*Time			0.76 (0.58-1.01)	0.058
Late Rural*Time			0.94 (0.82-1.08)	0.374
Early Semi-urban*Time			1.14 (0.93-1.41)	0.194
Late Semi-urban*Time			0.92 (0.81-1.05)	0.234
Age				
15-19 yrs	1.00 (Reference)		1.00 (Reference)	
20-24 yrs	1.30 (1.15-1.48)	<0.001	1.52 (1.33-1.73)	<0.001
25-29 yrs	1.47 (1.28-1.69)	<0.001	1.78 (1.54-2.06)	<0.001
30-34 yrs	1.21 (1.03-1.43)	0.019	1.48 (1.25-1.76)	<0.001
35+ yrs	0.80 (0.64-0.99)	0.042	0.92 (0.73-1.17)	0.500
Occupation				
Farmer/peasant	1.00 (Reference)		1.00 (Reference)	
Business owner	1.94 (1.62-2.31)	<0.001	1.31 (1.09-1.59)	0.005
Other	1.61 (1.43-1.81)	<0.001	0.94 (0.80-1.10)	0.429
Unknown/missing	0.91 (0.78-1.05)	0.191	0.83 (0.68-1.01)	0.063
Marital Status				
Single	1.00 (Reference)		1.00 (Reference)	
Married (mono/poly)	0.89 (0.80-1.00)	0.052	0.81 (0.71-0.92)	0.001
Widowed/divorced	1.06 (0.63-1.81)	0.820	1.18 (0.65-2.16)	0.584
Education				
Illiterate	1.00 (Reference)		1.00 (Reference)	
Literate but no schooling	1.12 (0.98-1.29)	0.096	1.15 (1.00-1.33)	0.054
Primary	1.93 (1.72-2.16)	<0.001	1.24 (1.08-1.41)	0.002
Secondary/Tertiary	1.88 (1.59-2.23)	<0.001	1.14 (0.94-1.38)	0.174

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[5] Early Urban site=Fort Portal, 1991-1994. Late Urban site=Fort Portal, 1995-2004. Early rural site=Nyabbani, Rukunyu and Kasule, 1991-1994. Late rural site=Nyabbani, 1995-2004. Early semi-urban site=Rwimi and Kyegegwa, 1991-1994. Late semi-urban site=Rwimi, 1995-2004.

Time

A 4.0 % yearly decrease in HIV risk (OR 0.96, 95 %CI 0.95-0.97) between 1991-2004 for the overall ANC population was shown in the univariate analysis.

Site

The site variable was a significant predictor of HIV status, and a decreasing risk of HIV was seen in the urban-semi urban-rural gradient. A decreased risk was also seen in sites with a surveillance period beginning in 1995 when compared to 1991, with the exception of the rural sites. Risk of HIV was highest in the urban site in 1991 (the reference category). Compared to the reference, HIV risk was lowest in the rural sites in 1991 and 1995 (both had risks that were 73 % lower than the reference). The two semi-urban sites had an HIV risk that was intermediate between the rural sites and the early urban site: risk was 35 % lower than the reference in the semi-urban site in 1991, and it was 55 % lower than the reference in the semi-urban site in 1995. Finally, the urban site in 1995 showed an HIV risk that was 17 % lower compared with the reference.

Age

Risk of HIV increased with age up to a peak at 25-29 years (OR 1.47, 95 %CI 1.28-1.69), then decreased to below the reference category (15-19 yrs) in the 35+ years age group.

Education

The univariate ORs showed increasing odds of being HIV positive through to the primary school level (OR 1.93, 95 %CI 1.72-2.16), with only a slight decline in HIV risk at the secondary/university level (1.88, 1.59-2.23). Overall, women who had attended school (primary, secondary or tertiary) had an increased likelihood of HIV-positive status compared to illiterate women.

Occupation

Compared to peasant farmers, which formed the majority of the sample, business owners were shown to have almost twice the risk of being HIV positive (OR 1.94, 95 %CI 1.62-2.31), followed by "other" occupations (1.61, 1.43-1.81), which included servants and students.

Univariate analysis: stratified sample

The overall univariate analysis showed different ORs for HIV risk among the different sites in the database. As one of the aims of this study was to describe HIV trends in different geographic strata of Kabarole District, a stratified univariate analysis was carried out for each of the six site categories. Another rationale for conducting a stratified analysis was the decreased quality of the urban data due to the removal of 1220 cases. **Tables 4a** and **4b** show odds ratios and 95 % confidence intervals for the stratified univariate analysis.

Time

In stratified univariate analysis, time was a significant predictor of HIV risk in all sites except early semi-urban and early and late urban. Declines in HIV risk over time were uniformly seen, although these declines existed to different degrees. Risk of HIV decreased most dramatically over time in the early rural site (OR 0.75, 95 %CI 0.59-0.96), although this decline became less pronounced after 1994 (0.94, 0.89-0.99). The urban site showed only marginal declines in HIV risk between 1991-1994 and 1995-2004, and these decreases were not statistically significant. The early semi-urban site showed an insignificant increase in HIV risk between 1991-1994 but a significant decline of 8.0 % per year occurred from 1995 onwards (0.92, 0.88-0.96, $p<0.001$).

Age

In general, there was an increasing likelihood of HIV positive status with age, with risk tapering off in the oldest age groups (30 years and older). However, age did not significantly predict HIV risk in early rural and early semi-urban sites, probably due to small sample size. In general, similar patterns of risk were seen in early and late periods in all 3 geographic strata. In the early urban site, risk peaked at age 20-24 years (OR 1.40, 95 %CI 1.06-1.86), declining thereafter to below the reference at ages 30-34 years. In the late urban site, the peak HIV risk shifted to the 25-29 year age group (2.57, 2.05-3.23), with all groups showing a higher risk than the reference (the 15-19 year group). In the early semi-urban site, peak risk was in the 20-24 year group (1.04, 0.69-1.58), similarly shifting to an older age group (30-34 years) in the late semi-urban site. The rural sites also followed this trend, with peak HIV risk occurring in the reference group in the early rural site, then shifting to the 30-34 year age group in the late rural site (1.88, 1.15-3.07). Notably, the peak HIV risk was seen slightly later (at ages 30-34 years vs 25-29 years) in the late semi-urban and late rural sites. This could indicate that in these areas, older women are more strongly affected by HIV infection, through a possible delayed awareness of HIV prevention information, or later onset of sexual activity.

Education

Generally, higher education level was associated with higher risk of HIV infection across sites. Interestingly, education did not significantly predict HIV status in the late urban, late semi-urban and late rural sites. A shift in peak HIV risk from higher to lower education was seen in two of the three geographic strata when comparing the period 1991-1994 with 1995-2004. The most dramatic change was seen when contrasting the early and late urban sites: between 1991-1994, HIV risk increased up to the secondary/tertiary level of education (OR 1.79, 95%CI 1.25-2.57), whereas in the period 1995-2004, peak risk had shifted to primary (1.10, 0.90-1.33), and those with higher education had a lower risk than the illiterate reference group. In the semi-urban site, the same shift in peak HIV risk was seen, but it was not as pronounced as that of the urban site. In the rural site, peak HIV risk remained in the secondary/tertiary education group, but there was a large drop in risk among those with primary education in the 1995-2004 period compared with 1991-1994.

Parity

Parity significantly predicted HIV status only in the early and late urban sites, where it showed similar trends to those of age group: HIV risk increased with parity up to a peak of 1-2 children, and decreased thereafter. The trends in the rural and semi-urban sites showed a later peak in risk: in the rural sites, peak risk shifted from 1-2 children in 1991-1994 to 6-9 children (OR 1.90, 95 %CI 1.16-3.11) in 1995-2004, and in the late semi-urban sites it shifted from 1-2 children in 1991-1994 to 3-5 children (1.24, 0.87-1.76) in 1995-2004. This strengthens the suggestion that older women are more severely affected by HIV in rural and semi-urban areas.

Occupation

In stratified univariate analysis, in all sites except early and late semi-urban, business owners were found to have the greatest risk of HIV infection when compared to their peasant/farmer counterparts. This confirms the results of the overall univariate analysis.

Marital status

Being married (in either a monogamous or a polygamous relationship) was shown in stratified univariate analysis to have a protective effect on HIV infection in all sites except late semi-urban, although this was only significant for the early urban site (OR 0.63, 95 %CI 0.48-0.83). Widowed and divorced women were significantly more likely to test HIV positive than single women in the late semi-urban site.

Table 4a: Univariate Logistic Regression stratified by site
Odds ratio (OR) and 95% confidence interval (CI)

	Early Urban (1991-1994)		Late Urban (1995-2004)	
	OR (95% CI)	**p-value**	**OR (95% CI)**	**p-value**
Age				
15-19 yrs	1.00 (Reference)		1.00 (Reference)	
20-24 yrs	1.40 (1.06-1.86)	0.018	2.13 (1.74-2.62)	<0.001
25-29 yrs	1.20 (0.88-1.66)	0.253	2.57 (2.05-3.23)	<0.001
30-34 yrs	0.53 (0.34-0.82)	0.004	1.95 (1.48-2.56)	<0.001
35+ yrs	0.40 (0.21-0.74)	0.004	1.02 (0.69-1.51)	0.927
Parity				
0	1.00 (Reference)		1.00 (Reference)	
1-2	1.18 (0.84-1.67)	0.333	1.88 (1.53-2.31)	<0.001
3-5	0.64 (0.44-0.94)	0.023	1.85 (1.49-2.30)	<0.001
6-9	0.40 (0.21-0.64)	<0.001	0.91 (0.64-1.28)	0.582
10-16	0.26 (0.03-2.02)	0.196	0.23 (0.03-1.67)	0.145
Time	0.99 (0.88-1.11)	0.841	0.99 (0.96-1.01)	0.258
Occupation				
Farmer/peasant	1.00 (Reference)		1.00 (Reference)	
Business owner	1.42 (1.02-2.00)	0.041	1.41 (1.06-1.88)	0.020
Other	0.97 (0.56-1.69)	0.927	0.91 (0.76-1.10)	0.327
Unknown/missing	0.68 (0.44-1.05)	0.085	0.84 (0.67-1.06)	0.143
Marital Status				
Single	1.00 (Reference)		1.00 (Reference)	
Married	0.63 (0.48-0.83)	0.001	0.88 (0.74-1.06)	0.187
Widowed/divorced			1.61 (0.56-4.62)	0.378

Table 4a: Univariate Logistic Regression stratified by site
Odds ratio (OR) and 95% confidence interval (CI)

	Early Urban (1991-1994)		Late Urban (1995-2004)	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Education				
Illiterate	1.00 (Reference)		1.00 (Reference)	
Literate (no schooling)	1.19 (0.73-1.93)	0.478	0.98 (0.75-1.28)	0.890
Primary	1.25 (0.96-1.63)	0.101	1.10 (0.90-1.33)	0.359
Secondary/Tertiary	1.79 (1.25-2.57)	0.002	0.88 (0.67-1.17)	0.383

Table 4b: Univariate Logistic Regression stratified by site
Odds ratio (OR) and 95% confidence interval (CI)

	Early Semi-urban (1991-1994)		Late Semi-urban (1995-2004)	
	OR (95%CI)	p-value	OR (95%CI)	p-value
Age				
15-19 yrs	1.00 (Reference)		1.00 (Reference)	
20-24 yrs	1.04 (0.69-1.58)	0.849	1.08 (0.77-1.52)	0.659
25-29 yrs	0.87 (0.54-1.39)	0.547	1.50 (1.04-2.17)	0.032
30-34 yrs	0.75 (0.42-1.33)	0.324	1.80 (1.22-2.67)	0.003
35+ yrs	0.76 (0.35-1.63)	0.479	0.92 (0.55-1.54)	0.747
Parity				
0	1.00 (Reference)		1.00 (Reference)	
1-2	1.16 (0.62-2.18)	0.644	1.13 (0.78-1.62)	0.516
3-5	1.03 (0.55-1.93)	0.929	1.24 (0.87-1.76)	0.227
6-9	0.87 (0.42-1.79)	0.696	0.83 (0.53-1.32)	0.439
10-16	0.86 (0.23-3.18)	0.816	1.12 (0.42-2.97)	0.819
Time	1.14 (0.97-1.35)	0.116	0.92 (0.88-0.96)	<0.001
Occupation				
Farmer/peasant	1.00 (Reference)		1.00 (Reference)	
Business owner	1.19 (0.72-1.97)	0.502	1.39 (0.70-2.75)	0.348
Other	2.07 (1.10-3.92)	0.025	1.96 (0.97-3.97)	0.060
Unknown/missing			1.09 (0.74-1.61)	0.667
Marital Status				
Single	1.00 (Reference)		1.00 (Reference)	
Married	0.61 (0.34-1.07)	0.085	1.16 (0.91-1.49)	0.238
Widowed/divorced			4.28 (1.06-17.35)	0.042
Education				
Illiterate	1.00 (Reference)		1.00 (Reference)	
Literate (no schooling)	1.90 (1.21-2.97)	0.005	1.26 (0.96-1.67)	0.102
Primary	2.41 (1.56-3.74)	<0.001	1.35 (0.93-1.96)	0.114
Secondary/Tertiary	2.59 (1.40-4.82)	0.003	1.29 (0.79-2.12)	0.310

Table 4c: Univariate Logistic Regression stratified by site
Odds ratio (OR) and 95% confidence interval (CI)

	Early Rural (1991-1994)		Late Rural (1995-2004)	
	OR (95% CI)	**p-value**	**OR (95% CI)**	**p-value**
Age				
15-19 yrs	1.00 (Reference)		1.00 (Reference)	
20-24 yrs	0.65 (0.35-1.21)	0.173	1.03 (0.65-1.63)	0.906
25-29 yrs	0.90 (0.43-1.88)	0.774	1.47 (0.91-2.35)	0.114
30-34 yrs	0.57 (0.24-1.37)	0.207	1.88 (1.15-3.07)	0.011
35+ yrs	0.30 (0.07-1.33)	0.113	1.33 (0.74-2.37)	0.342
Parity				
0	1.00 (Reference)		1.00 (Reference)	
1-2	1.03 (0.45-2.32)	0.951	0.80 (0.54-1.21)	0.296
3-5	0.85 (0.39-1.83)	0.673	1.03 (0.68-1.54)	0.905
6-9	0.53 (0.20-1.46)	0.222	1.90 (1.16-3.11)	0.011
10-16	0.85 (0.18-4.01)	0.839	1.45 (0.42-4.96)	0.557
Time	0.75 (0.59-0.96)	0.021	0.94 (0.89-99)	0.011
Occupation				
Farmer/peasant	1.00 (Reference)		1.00 (Reference)	
Business owner	1.90 (0.78-4.65)	0.159	3.89 (1.40-10.84)	0.009
Other	1.55 (0.35-6.85)	0.563	1.10 (0.33-3.61)	0.882
Unknown/missing			0.49 (0.32-0.77)	0.002
Marital Status				
Single	1.00 (Reference)		1.00 (Reference)	
Married	0.89 (0.39-2.01)	0.775	0.87 (0.54-1.42)	0.584
Widowed/divorced	6.00 (0.48-74.67)	0.164	1.45 (0.55-3.80)	0.450
Education				
Illiterate	1.00 (Reference)		1.00 (Reference)	
Literate (no schooling)	0.89 (0.48-1.66)	0.713	1.07 (0.77-1.48)	0.693
Primary	1.76 (0.71-4.36)	0.222	0.87 (0.50-1.52)	0.627
Secondary/Tertiary	2.95 (0.82-10.69)	0.099	1.23 (0.55-2.72)	0.617

4) *Multivariate Logistic Regression*

A logistic regression analysis was performed on HIV status as outcome and six potential confounders: age group (categorical), time (continuous), site (categorical), marital status (categorical), education (categorical) and occupation (categorical). Because different trends in HIV risk over time were found in the different sites in the univariate analyses, site*time was entered into the model as an interaction variable. Standard errors observed for each variable were no higher than expected, indicating that multicollinearity was not present. **Table 3** shows odds ratios and 95 % confidence intervals for odds ratios for each of the six predictors in the main multivariate model. In the model, the variables site, age group, education, occupation and marital status, but not time, reliably predicted HIV status ($p<0.05$).

Changes in HIV risk over time

Overall HIV risk was highest in the urban site in 1991 (the reference). The second-highest risk was followed by the urban site in 1995, which had 86 % of the reference risk. Risk was dramatically lower in the early semi-urban site in 1991 compared with the early urban site in the same year; this site had only 49 % of the reference risk. HIV risk equalled the reference, however, in the late semi-urban site (1995). In the rural sites, risk of HIV was lowest with 62 % and 57 % of the reference risk in 1991 and 1995, respectively.

After adjusting for age, marital status, occupation and education, the risk of being HIV positive declined by less than 1 % per year over the period 1991-1994 in the early urban site (the reference). Compared to the reference site, HIV risk did not decline in the urban site between 1995-2004. Furthermore, these results were not statistically significant. In other words, after adjusting for potential confounders, the HIV prevalence in the urban sites did not significantly change (increase or decrease) over time; in fact, the only site which showed a borderline significant change in HIV risk over time was the early rural site, where HIV risk declined by 25 % per year between 1991-1994. The trend in the rural site between 1995-2004, although still decreasing was less dramatic, with a decrease in HIV risk of only 7 % per year. The early and late semi-urban sites showed opposing trends. In the early semi-urban sites (1991-1994), a 13% increase in HIV risk per year over 1991-1994 was found; however, a decrease of 8 % per year was seen over the period 1995-2004 in the late semi-urban site.

Age

Based on the magnitude of the ORs in the multivariate model, age group appeared to be the most influential predictor of an HIV-positive outcome (Tabachnik & Fidell 2001). After adjusting for the potential confounders education, occupation, site, time and marital status, the odds of being HIV-infected increased with increasing age, peaking at 25-29 years (OR 1.78, 95 %CI 1.54-2.06, $p<0.001$). The odds then decreased in the older age groups 30-34 years and 35+ years. The lowest odds were found in the 35+ years age group, although this was not statistically significant.

Occupation

Business owners were 31 % more likely to be HIV positive (OR 1.31, 95 % CI 1.09-1.59) compared to farmers/peasants (reference) after adjusting for marital status, age, time, education and site. "Other", including servants and students, and "unknown" occupations were found to have decreased odds of being HIV positive compared to the reference after adjusting for potential confounders.

Marital status

Being married decreased women's odds of being HIV-positive by nearly 20 % (OR 0.81, 95 %CI 0.71-0.92, p=0.001) after adjusting for site, age, time, education and occupation. Being widowed or divorced appeared to increase HIV risk (1.18, 0.65-2.16), although it did not significantly predict HIV status after adjusting for the covariates.

5) Multivariate models stratified by site and age group

After examining the findings from the main multivariate model, stratified models were created to see if the influence of each covariate on HIV risk would differ among the sites and age groups represented in the sample. The results of the stratified models are summarized in **Tables 5a, 5b, 5c, 6a and 6b.**

Table 5a: Multivariate Logistic Regression stratified by site
Odds ratio (OR) and 95 % confidence interval (CI)

	Early Urban (1991-1994)		**Late Urban (1995-2004)**	
	OR (95 % CI)	**p-value**	**OR (95 % CI)**	**p-value**
Age				
15-19 yrs	1.00 (Reference)		1.00 (Reference)	
20-24 yrs	1.44 (1.08-1.91)	0.013	2.27 (1.84-2.80)	<0.001
25-29 yrs	1.32 (0.95-1.84)	0.093	2.72 (2.16-3.44)	<0.001
30-34 yrs	0.60 (0.38-0.93)	0.023	2.13 (1.61-2.81)	<0.001
35+ yrs	0.46 (0.24-0.87)	0.017	1.10 (0.74-1.64)	0.640
Time	0.98 (0.86-1.11)	0.699	1.00 (0.96-1.03)	0.768
Marital Status				
Single	1.00 (Reference)		1.00 (Reference)	
Married	0.68 (0.51-0.90)	0.007	0.75 (0.62-0.92)	0.004
Widowed/divorced			1.04 (0.33-3.35)	0.944

Table 5a: Multivariate Logistic Regression stratified by site Odds ratio (OR) and 95 % confidence interval (CI)

	Early Urban (1991-1994)		Late Urban (1995-2004)	
	OR (95 % CI)	p-value	OR (95 % CI)	p-value
Education				
Illiterate	1.00 (Reference)		1.00 (Reference)	
Literate	1.10 (0.67-1.81)	0.718	1.00 (0.76-1.33)	0.978
Primary	1.13 (0.86-1.49)	0.377	1.11 (0.91-1.36)	0.298
Secondary/Tertiary	1.44 (0.98-2.11)	0.061	0.76 (0.57-1.02)	0.071
Occupation				
Farmer/peasant	1.00 (Reference)		1.00 (Reference)	
Business owner	1.24 (0.87-1.77)	0.225	1.36 (1.00-1.85)	0.047
Other	0.83 (0.47-1.47)	0.517	0.93 (0.76-1.14)	0.500
Unknown/missing	0.68 (0.43-1.06)	0.090	0.85 (0.62-1.17)	0.315

Table 5b: Multivariate Logistic Regression stratified by site Odds ratio (OR) and 95 % confidence interval (CI)

	Early Semi-urban (1991-1994)		Late Semi-urban (1995-2004)	
	OR (95 %CI)	p-value	OR (95 %CI)	p-value
Age				
15-19 yrs	1.00 (Reference)		1.00 (Reference)	
20-24 yrs	1.10 (0.71-1.69)	0.678	1.14 (0.81-1.61)	0.457
25-29 yrs	0.98 (0.60-1.62)	0.946	1.66 (1.13-2.42)	0.010
30-34 yrs	0.87 (0.47-1.60)	0.652	1.94 (1.29-2.90)	0.001
35+ yrs	0.86 (0.39-1.89)	0.705	0.95 (0.55-1.62)	0.842
Time	1.07 (0.89-1.27)	0.490	0.90 (0.85-0.95)	<0.001
Marital Status				
Single	1.00 (Reference)		1.00 (Reference)	
Married	0.78 (0.42-1.43)	0.417	1.07 (0.82-1.39)	0.624
Widowed /divorced			2.71 (0.63-11.62)	0.180
Education				
Illiterate	1.00 (Reference)		1.00 (Reference)	
Literate	1.74 (1.08-2.79)	0.023	1.24 (0.93-1.65)	0.139
Primary	2.33 (1.47-3.69)	<0.001	1.15 (0.77-1.73)	0.503
Secondary /Tertiary	1.60 (0.60-4.26)	0.348	0.96 (0.53-1.74)	0.879
Occupation				
Farmer/peasant	1.00 (Reference)		1.00 (Reference)	
Business owner	0.92 (0.53-1.57)	0.751	1.18 (0.58-2.43)	0.646
Other	1.91 (0.66-5.51)	0.234	1.67 (0.72-3.86)	0.232
Unknown /missing			1.61 (1.02-2.53)	0.041

Table 5c: Multivariate Logistic Regression stratified by site Odds ratio (OR) and 95 % confidence interval (CI)

	Early Rural (1991-1994)		Late Rural (1995-2004)	
	OR (95 % CI)	**p-value**	**OR (95 % CI)**	**p-value**
Age				
15-19 yrs	1.00 (Reference)		1.00 (Reference)	
20-24 yrs	0.62 (0.33-1.17)	0.139	1.10 (0.69-1.76)	0.678
25-29 yrs	0.84 (0.40-1.79)	0.651	1.62 (1.00-2.62)	0.051
30-34 yrs	0.52 (0.22-1.28)	0.155	1.98 (1.20-3.25)	0.007
35+ yrs	0.33 (0.08-1.47)	0.145	1.23 (0.68-2.22)	0.502
Time	0.76 (0.59-0.98)	0.037	0.97 (0.91-1.03)	0.306
Marital Status				
Single	1.00 (Reference)		1.00 (Reference)	
Married	1.01 (0.43-2.39)	0.980	0.53 (0.31-0.89)	0.018
Widowed /divorced	5.20 (0.39-70.03)	0.214	1.38 (0.51-3.71)	0.524
Education				
Illiterate	1.00 (Reference)		1.00 (Reference)	
Literate	0.87 (0.46-1.64)	0.657	1.14 (0.82-1.58)	0.441
Primary	1.45 (0.57-3.67)	0.435	0.86 (0.49-1.52)	0.611
Secondary /Tertiary	3.11 (0.76-12.75)	0.114	1.09 (0.43-2.74)	0.858
Occupation				
Farmer/peasant	1.00 (Reference)		1.00 (Reference)	
Business owner	1.67 (0.66-4.24)	0.280	2.66 (0.85-8.33)	0.094
Other	1.01 (0.19-5.52)	0.988	0.94 (0.24-3.77)	0.934
Unknown /missing			0.42 (0.24-0.72)	0.002

Table 6a: Multivariate Logistic Regression stratified by age group (under 25 years)
Odds ratio (OR) and 95 % confidence interval (CI)

	15-19 years		20-24 years	
	OR (95 % CI)	p-value	OR (95 % CI)	p-value
Site[6]				
Early Urban	1.00 (Reference)		1.00 (Reference)	
Late Urban	0.29 (0.12-0.71)	0.007	1.33 (0.57-3.10)	0.511
Early Rural	0.40 (0.10-1.63)	0.201	0.85 (0.22-3.37)	0.821
Late Rural	0.14 (0.03-0.64)	0.011	0.51 (0.15-1.69)	0.268
Early Semi-urban	0.37 (0.11-1.20)	0.097	0.64 (0.20-1.99)	0.436
Late Semi-urban	0.28 (0.09-0.87)	0.028	1.45 (0.51-4.09)	0.487
Time	0.78 (0.63-0.97)	0.026	1.06 (0.86-1.32)	0.567
Site*Time				
Late Urban *Time	1.27 (1.01-1.59)	0.038	0.90 (0.72-1.12)	0.354
Early Rural*Time	0.98 (0.61-1.58)	0.930	0.58 (0.36-0.95)	0.029
Late Rural*Time	1.25 (0.97-1.61)	0.081	0.86 (0.68-1.09)	0.220
Early Semi-urban *Time	1.24 (0.85-1.80)	0.263	0.94 (0.66-1.35)	0.740
Late Semi-urban *Time	1.22 (0.96-1.55)	0.100	0.81 (0.64-1.02)	0.075
Marital Status				
Single	1.00 (Reference)		1.00 (Reference)	
Married	0.97 (0.77-1.22)	0.763	0.89 (0.71-1.11)	0.287
Widowed/divorced			3.62 (1.19-11.05)	0.024
Education				
Illiterate	1.00 (Reference)		1.00 (Reference)	
Literate	1.22 (0.90-1.65)	0.206	1.32 (1.02-1.71)	0.034
Primary	1.30 (0.99-1.70)	0.059	1.31 (1.04-1.65)	0.021
Secondary/Tertiary	0.86 (0.55-1.35)	0.514	1.05 (0.77-1.44)	0.758
Occupation				
Farmer/peasant	1.00 (Reference)		1.00 (Reference)	
Business owner	1.14 (0.77-1.69)	0.505	1.30 (0.95-1.78)	0.104
Other	0.73 (0.52-1.03)	0.069	1.06 (0.82-1.38)	0.664
Unknown/missing	0.76 (0.49-1.19)	0.232	0.89 (0.63-1.26)	0.510

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[6] Early Urban site=Fort Portal, 1991-1994. Late Urban site=Fort Portal, 1995-2004. Early rural site=Nyabbani, Rukunyu and Kasule, 1991-1994. Late rural site=Nyabbani, 1995-2004. Early semi-urban site=Rwimi and Kyegegwa, 1991-1994. Late semi-urban site=Rwimi, 1995-2004.

Table 6b: Multivariate Logistic Regression stratified by age group (25 years and over)
Odds ratio (OR) and 95 % confidence interval (CI)

	25-29 years		30-34 years		35+ years	
	OR (95 % CI)	p-value	OR (95 %CI)	p-value	OR (95 %CI)	p-value
Site[7]						
Early Urban	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
Late Urban	1.17 (0.42-3.27)	0.760	3.50 (0.65-18.90)	0.146	0.19 (0.01-2.96)	0.237
Early Rural	0.89 (0.12-6.40)	0.907	0.65 (0.04-9.72)	0.758	0.01 (0.00-15.48)	0.204
Late Rural	0.87 (0.20-3.76)	0.856	4.28 (0.60-30.75)	0.148	1.33 (0.07-26.66)	0.854
Early Semi-urban	0.35 (0.08-1.47)	0.152	1.87 (0.21-16.99)	0.577	0.02 (0.00-1.53)	0.075
Late Semi-urban	2.17 (0.58-8.14)	0.251	6.04 (0.93-39.39)	0.060	0.14 (0.01-2.98)	0.208
Time	1.13 (0.87-1.47)	0.360	1.36 (0.88-2.10)	0.170	0.80 (0.40-1.57)	0.509
Site*Time						
Late Urban *Time	0.91 (0.70-1.20)	0.502	0.76 (0.49-1.19)	0.226	1.39 (0.69-2.80)	0.364
Early Rural*Time	0.68 (0.35-1.32)	0.250	0.85 (0.37-1.97)	0.709	3.36 (0.42-26.93)	0.254
Late Rural*Time	0.83 (0.62-1.11)	0.208	0.69 (0.44-1.09)	0.113	1.14 (0.56-2.32)	0.716
Early Semi-urban *Time	1.16 (0.74-1.82)	0.515	0.84 (0.43-1.64)	0.608	3.64 (1.06-12.44)	0.040
Late Semi-urban *Time	0.78 (0.59-1.04)	0.090	0.68 (0.44-1.08)	0.101	1.40 (0.69-2.86)	0.357
Marital Status						
Single	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
Married	0.62 (0.46-0.83)	0.001	0.58 (0.40-0.84)	0.004	0.47 (0.26-0.84)	0.011
Widowed/ divorced	0.99 (0.34-2.88)	0.992			1.52 (0.40-5.76)	0.535
Education						
Illiterate	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
Literate	0.97 (0.71-1.31)	0.822	0.99 (0.68-1.44)	0.942	1.44 (0.81-2.57)	0.217
Primary	1.13 (0.86-1.48)	0.384	0.86 (0.59-1.27)	0.447	2.04 (1.14-3.68)	0.017
Secondary/ Tertiary	1.24 (0.85-1.82)	0.269	1.22 (0.71-2.11)	0.473	1.58 (0.59-4.21)	0.362
Occupation						
Farmer/peasant	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
Business owner	1.16 (0.77-1.74)	0.480	2.10 (1.19-3.71)	0.011	1.38 (0.52-3.68)	0.520
Other	0.99 (0.72-1.38)	0.973	1.11 (0.70-1.76)	0.665	1.23 (0.54-2.77)	0.623
Unknown/ missing	0.64 (0.42-0.97)	0.037	1.04 (0.61-1.76)	0.887	1.23 (0.57-2.66)	0.592

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[7] Early Urban site=Fort Portal, 1991-1994. Late Urban site=Fort Portal, 1995-2004. Early rural site=Nyabbani, Rukunyu and Kasule, 1991-1994. Late rural site=Nyabbani, 1995-2004. Early semi-urban site=Rwimi and Kyegegwa, 1991-1994. Late semi-urban site=Rwimi, 1995-2004.

Site-stratified multivariate model

The findings of the univariate analyses and the overall multivariate model were confirmed and expanded upon in the site-stratified multivariate analysis, which provided a more detailed understanding of HIV trends within each site over time.

Change in HIV risk over time

In stratified multivariate analysis, HIV risk declined over time in all sites except for late urban and early semi-urban, although the only statistically significant changes in HIV risk occurred in the early rural and late semi-urban sites. The most dramatic decrease was seen in the early rural sites over the period 1991-1994 (OR 0.76, 95 %CI 0.59-0.98, p=0.037). The decrease in the rural site was less pronounced in the period 1995-2004, and was not statistically significant (0.97, 0.91-1.03, p=0.306). Similar to the overall multivariate model, the semi-urban sites displayed opposite trends in 1991-1994 and 1995-2004. A 7 % yearly increase in HIV risk was seen between 1991-1994 (insignificant), but a statistically significant 10% yearly decrease (0.90, 0.85-0.95) was seen in the period 1995-2004. The urban trends showed only a marginal, statistically insignificant decrease over the period 1991-1994 (0.98, 0.86-1.11, p=0.699), and no change in HIV risk whatsoever in the period 1995-2004.

Education[8]

The results from the stratified univariate analysis were confirmed in the site-stratified multivariate analysis after adjusting for age, marital status and occupation. The early urban site displayed an increasing trend in HIV risk with increasing education up to the secondary/tertiary level, but in the late urban site, peak HIV risk had shifted to the primary school level. A shift in peak HIV risk from higher to lower higher education levels when comparing 1991-1994 with 1995-2004 was also seen in the semi-urban stratum. Interestingly, however, in the semi-urban sites HIV risk peaked at a lower level of education than the urban site; in 1991-1994 the highest risk was found in women with a primary school education (OR 2.33, 95 %CI 1.47-3.69, p<0.001), with a decreased risk for those with secondary/tertiary education. In the period 1995-2004, peak HIV risk had shifted to women who were literate but had not attended school (1.24, 0.93-1.65, p=0.503). In the rural sites, education did not significantly predict HIV status after adjusting for other covariates and there was no clear trend in HIV risk with increasing education; however, a shift in peak HIV risk from higher to lower education levels when comparing 1991-1994 and 1995-2004 was seen.

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[8] Note: In both stratified multivariate analyses, after adjusting for other variables, most associations between education and HIV status were statistically insignificant.

Age

As expected, the stratified multivariate analysis revealed that HIV risk increased with increasing age, after adjusting for marital status, occupation and education. This was especially true in the later period (1995-2004) in all three geographic strata, although it was also true in the early urban site. As in the stratified univariate analysis, peak HIV risk was seen to shift from younger to older groups when comparing the periods 1991-1994 with 1995-2004. Peak risk was seen at age 20-24 years in the early urban site (OR 1.44, 95 %CI 1.08-1.91), but this risk shifted to the 25-29 year group in the late urban site (2.72, 2.16-3.44, p<0.001). Similar shifts were seen in the semi-urban sites, although in the 1995-2004 period, peak HIV risk occurred in a slightly older age group - 30-34 years (1.94, 1.29-2.90, p=0.001). Findings were similar in the rural sites where peak HIV prevalence shifted from the reference group in 1991-1994 to the 30-34 year group in 1995-2004 (1.98, 1.20-3.25, p=0.007). Age-related trends in HIV risk in the early semi-urban and early rural sites were statistically insignificant.

Occupation

In the stratified analysis, business owners were the occupation at highest risk of HIV infection in the urban and rural sites. This was not the case in the early and late semi-urban sites, which showed a peak risk in the "other" occupations, including servants and students.

Marital status

After adjusting for education, occupation, age and time, being married reduced women's risk of contracting HIV in the early and late urban, late rural and early semi-urban sites. The reduction in risk by being married was largest in the late rural site, decreasing by nearly half (OR 0.53, 95 %CI 0.31-0.89, p=0.018). However, in the early rural site and the late semi-urban site (in the semi-urban site, as shown above, numbers of single and married ANC attendees were similar), women who were married were at greater risk. Neither of these results was statistically significant.

Age-stratified multivariate model

After adjusting for covariates of interest, this model predicts a decrease in HIV risk over time in younger women (ages 15-19 and under). It also predicts an increase in risk for women aged 20-34 years, although this is not statistically significant.

Change in HIV risk over time

After adjusting for marital status, education and occupation, women in the age group 15-19 years were shown to have the greatest risk of HIV infection if they were living in an urban area in 1991 (reference). This risk was dramatically less in every other site included in the analysis: compared to the early urban site, HIV risk was over 70 % lower in the urban area in 1995, and 63 % and 72% lower in the semi-urban site in 1991 and 1995, respectively. In the early rural site (1991), HIV risk was 60 % lower than in the urban site in 1991, and the lowest HIV risk, 86 % lower than the reference, was found in the late rural site. This pattern of highest risk in urban areas and lowest risk in rural areas was similar for all women under 25 years of age. Interestingly, though, HIV risk was highest in the late semi-urban site for women 20-24 years, 25-29 years and 30-34 years. In women over 25 years, no clear urban-semi-urban-rural trend in HIV risk could be seen. The age-stratified model yielded important insights into changes in HIV risk over time within the different age groups after adjusting for marital status, time, education, occupation and site.

This model showed that in all sites, the youngest age group (15-19 years) experienced a consistent reduction in HIV risk over time, in contrast to all other age groups. These reductions were statistically significant in the early urban site, where women 15-19 experienced a 22 % decrease per year (OR 0.78, 95 %CI

0.63-0.97, p=0.026) and the late urban site, where the decrease was much smaller, at approximately 1 % per year.

Women in the 20-24 year age group also experienced a decrease in HIV risk over time in most sites, although the only statistically significant yearly decrease (38 %) was found in the early rural site. Unlike their younger counterparts, this age group experienced a slight increase in HIV risk in the early and late urban sites (6 % per year in the early urban and 2 % in the late urban). A 9 % per year decrease in HIV risk for this age group occurred in the late semi-urban site, but a slight increase was seen in the early semi-urban site (both were statistically insignificant).

In women over age 25, there were no statistically significant changes in HIV risk over time, except a nearly 300 % yearly increase in women 35 years and older, in the early semi-urban site. In most sites, stagnating or increasing HIV risk was seen. As expected, in women over 35 years of age, increases in HIV risk over time occurred in nearly every site except the late rural, where a slight decrease was seen (although this was statistically insignificant).

Education

In the younger age groups, the effect of education on HIV risk after adjusting for marital status, occupation, site and time was similar to the main model: in 15-19 year olds, HIV risk increased with increasing education, reaching a peak (OR 1.30, 95%CI 0.99-1.70) among those with a primary school education compared to the reference group of illiterate women. 15-19 year old women with higher education (secondary or tertiary), however, had the lowest risk of HIV infection (0.86, 0.55-1.35). A similar pattern of lowered HIV risk with secondary/tertiary education was seen in the 20-24 year age group. However, in the 25-29 year group and the 30-34 year group, no decline in risk occurred with education levels higher than primary; in fact, a continued increase was seen with higher education levels. In women aged 35 years and older, HIV risk more than doubled with a primary education, and remained 70 % higher than the reference in women with secondary/tertiary education. In general, the adjusted ORs for education level were more significantly associated with lower HIV risk for young females (under 25 years) than for older females.

Occupation

Across all age groups, business owners were the occupation with the highest risk of HIV infection after adjusting for marital status, education, site and time. This risk was only 18 % higher than the reference (peasant farmers) in the 15-19 year age group, but it became more pronounced in the older groups: 27 % higher than the reference in those aged 20-24 yrs, and more than double the reference risk in those aged 30-34 years.

Marital status

Being married reduced women's HIV risk after adjusting for education, occupation, site and time, regardless of age. This was true for all age groups, and was statistically significant for women 25 years of age and over.

Summary of ANC results

The analysis of the ANC data for Kabarole District showed the following:

Crude HIV prevalence decreased over time in all geographic strata between 1995 and 2004, although chi-square values indicated that the decrease was statistically significant only in the semi-urban and rural sites. In the 1991-1994 period, crude HIV prevalence declined in urban and rural sites only.

Overall HIV risk was highest in the urban site in 1991 (the reference). The semi-urban sites had a lower risk of HIV compared to both the early and late urban sites, and the rural sites had the lowest HIV risk of all. The risk was also lower in the urban and rural strata in the year 1995 compared with 1991.

The multivariate model showed that the risk of HIV declined over time (1991-2004) in 15-19 year old women in the early and late urban sites. HIV risk increased over time in women over 25 years of age, although this was statistically insignificant.

An interesting association between HIV risk and education was seen in stratified multivariate analysis when comparing the early and late surveillance periods: in 1991-1994, peak HIV risk was usually found in the highest levels of education normally attained in the site (either secondary/tertiary or primary), but peak risk shifted to a lower level of education (either literate but no schooling, or primary level) in 1995-2004, while those with higher education showed a decreased HIV risk in this period. It should be noted, however, that most associations between HIV and education were not statistically significant.

In multivariate analysis, married women, especially those over 25 years of age, had a lower risk of HIV infection than single women. Business or trading-related occupations were shown to have the highest risk of HIV infection across all age groups, and in all sites except the semi-urban (early and late), where "other" occupations (including servants and students) had the highest risk.

Results of the household survey

The results of the cross-sectional household survey are summarized here. A detailed list of frequencies for the entire sample and stratified by gender can be found in Appendix I.

There were 252 respondents in total, representing 36 clusters of seven people each. Just over forty percent of the respondents (n=101) were male and 151 (59.9 %) were female. This was expected, as the interviews were conducted during the day when men are at work, and women are more likely to be at home. Respondents were evenly distributed over Fort Portal Municipality, which is divided into three main geographical zones. Seventy-eight respondents (31 % of the sample) resided in the eastern zone, 112 (44.4 %) in the more populous southern zone, and 62 (24.6 %) in the western zone. Rutooro was the most frequently used language during household surveys. Interviews averaged 40 minutes-1 hour in length.

1) Sample description[9]

A summary of sociodemographic characteristics of household survey respondents is presented in **Table 7**.

Table 7: Sociodemographic characteristics of household survey respondents

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
Respondent house (N=252)	Semi-permanent	152	60.3	65	64.4	87	57.6
	Permanent	99	39.3	35	34.7	64	42.4
	Temporary	1	0.4	1	1.0		
	TOTAL	252	100	101	100	151	100
Respondent Role (N=252)	Head of household	84	33.3	56	55.4	28	18.7
	Spouse	83	32.9	3	3.0	80	53.3
	Son/daughter	54	21.4	27	26.7	27	18.0
	Relative	22	8.7	11	10.9	11	7.3
	Employee	6	2.4	2	2.0	4	2.7
	Friend	1	0.4	1	1.0		
	Other	1	0.4	1	1.0		
	Unknown/missing	1	0.4			1	0.6
	TOTAL	252	100	101	100	151	100
Sex	Male	101	40.1				

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[9] **A note on socio-economic status:** The BHS Team Leader confirmed that the socio-economic characteristics of the 36 LC1s sampled were similar, and were characteristic of Fort Portal Municipality as a whole.

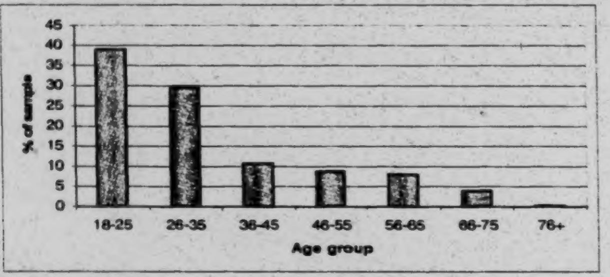
Table 7: Sociodemographic characteristics of household survey respondents

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
(N=252)	Female	151	59.9				
	TOTAL	252	100				
Religion (N=252)	Catholic	117	46.4	52	51.5	65	43.0
	Protestant	77	30.6	26	25.7	51	33.8
	Muslim	33	13.1	16	15.8	17	11.3
	Pentecostal	13	5.2	1	1.0	12	7.9
	Seventh Day Adventist	7	2.8	3	3.0	4	2.6
	Cults	4	1.6	2	2.0	2	1.3
	Other	1	0.4	1	1.0		
	TOTAL	252	100	101	100	151	100
Occupation (N=251)	Self-employed	95	37.8	55	55.0	40	26.5
	Student	34	13.5	18	18.0	16	10.6
	Peasant	32	12.7	8	8.0	24	15.9
	Unemployed	21	8.4	1	1.0	20	13.2
	Housewife	19	8.0			19	12.6
	Professional	14	5.6	6	6.0	8	5.3
	Farmer	12	4.8	3	3.0	9	6.0
	Retired	11	4.4	4	4.0	7	4.6
	Other	9	3.6	4	4.0	5	3.3
	Businessman/woman	4	1.6	1	1.0	3	2.0
	Unknown/missing			1	1.0		
	TOTAL	252	100	101	100	151	100
Monthly Income (N=241)	Seasonal	48	19.9	10	10.3	38	26.4
	< 100 000 ugsh	138	57.3	61	62.9	77	53.5
	100 000 - 200 000 ugsh	37	15.4	17	17.5	20	13.9
	200 000 – 300 000 ugsh	12	5.0	4	4.1	8	5.6
	> 300 000 ugsh	6	2.5	5	5.2	1	0.7
	Unknown/missing	11	4.4	4	4.0	7	4.6
	TOTAL	252	100	97	100	151	100
Marital Status (N=249)	Single	111	44.6	64	64.0	47	31.5
	Married	95	38.2	32	32.0	63	42.3
	Widowed	28	11.2	3	3.0	25	16.8
	Divorced	15	6.0	1	1.0	14	9.4
	Unknown/missing	3	1.2	1	1.0	2	1.3
	TOTAL	252	100	100	100	151	100
Education (N=252)	No education	27	10.7	7	6.9	20	13.2
	Lower primary	28	11.1	11	10.9	17	11.3
	Upper primary	82	32.5	32	31.7	50	33.1
	O-levels	77	30.6	31	30.7	46	30.5
	Technical	4	1.6	4	4.0		
	A-levels	8	3.2	5	5.0	3	2.0
	Tertiary institutions	24	9.5	10	9.9	14	9.3
	Other	2	0.8	1	1.0	1	0.7
	TOTAL	252	100	101	100	151	100

Age

Respondents ranged in age from 18 to 89 years, with a mean age of 33.3 years. The sample was relatively young, with 38.9 % belonging to the 18-25 year age group.

Figure 18: Age distribution of household survey respondents

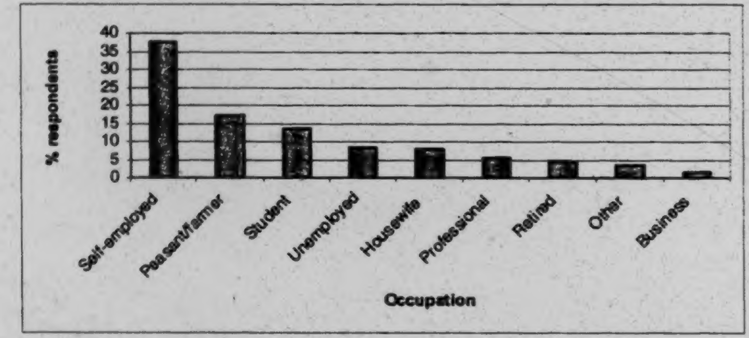


Housing

Housing type was used as a proxy measure for socio-economic status. Most respondents (152, 60.3 %) lived in semi-permanent housing, which was defined as a mud or wattle house with a tin roof. A further 99 respondents (39.3 %) lived in permanent houses made of hard materials such as concrete, and one respondent lived in a temporary house, defined as a house made of mud with a thatched roof.

Occupation

Figure 19: Occupation distribution of household survey respondents

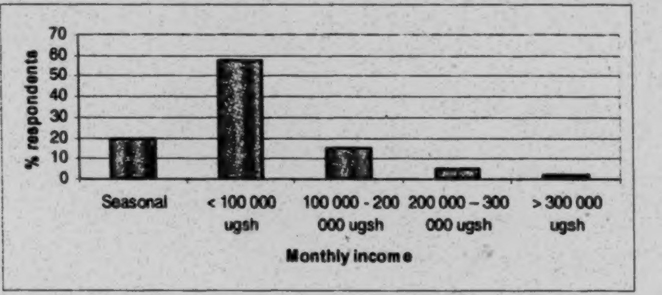


Self-employment (such as selling food or goods in the market) was the most frequently reported occupation of respondents (37.7 %). 44 respondents were peasants/farmers (17.4 %) and 34 respondents (13.5 %) were students. Other occupations included housewives, professionals (civil servants, teachers, health professionals) and businesspeople.

Monthly income

The sample had a relatively low income, with over half of respondents reporting earning less than 100 000 Ugsh (approximately $63 CDN) per month. A significant number (n=48, 19.9 %) reported earning a seasonal income, harvesting and selling staple crops such as maize, matooke and beans a few times per year when these crops are in season, making as little as 10 000 Ugsh per season. Women had a lower income than men with 26.4% (vs 10.3 % of male respondents) reporting a seasonal income.

Figure 20: Income distribution of household survey respondents



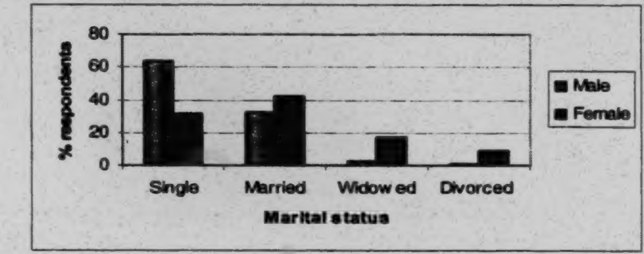
Religion

All respondents reported a religious affiliation. The most frequent was Catholicism (117 respondents, 46.4 %), followed by protestantism (77 respondents, 30.6 %), islam (33 respondents, 13.1 %), pentecostal (13 respondents, 5.2%), and cults (four respondents, 1.6%).

Marital Status

111 respondents (44.6 %) were single, 95 (38.3 %) were married, 28 (11.2 %) were widowed and 15 (6.0 %) were divorced. Males were more likely to be single, and females were more likely to be married. A higher proportion of women were divorced or widowed than men (25.2 % vs 4.0 %).

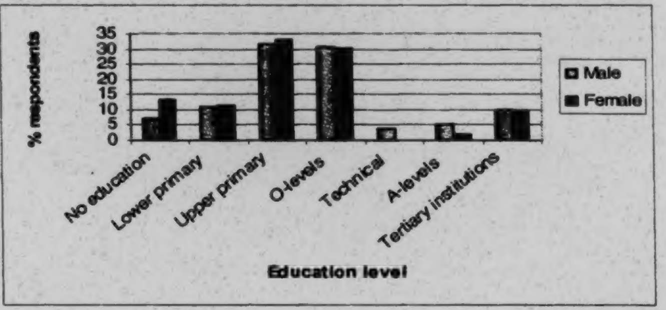
Figure 21: Marital status of household survey respondents, by gender



Education

This was a relatively well-educated sample, representative of an urban area. The male portion of the sample was slightly more highly educated than the females; this was particularly apparent from the proportions of respondents with no education (6.9 % of males and 13.2 % of females).

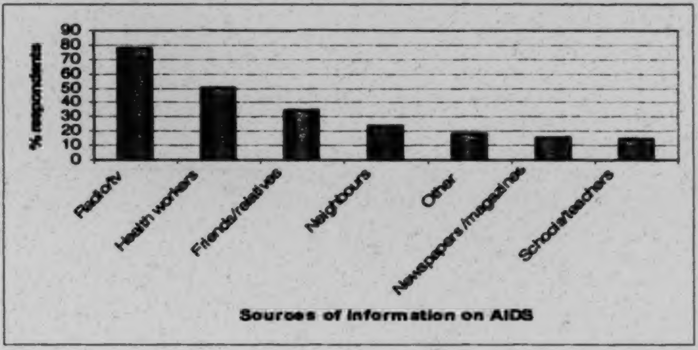
Figure 22: Educational attainment of respondents, by gender



2) Awareness and knowledge of HIV/AIDS

The sample was highly aware of HIV/AIDS, its modes of transmission and prevention. 100 % of the 252 respondents had heard of AIDS. When asked where they had heard of AIDS, respondents cited a range of different information sources. By far the most popular was through the electronic media (radio or television, mentioned by 198 people - 78.5 % of the sample). The print media (newspaper and magazines) was also mentioned. Health workers at hospitals or clinics were also cited by 128 people (50.7 %) as a means of AIDS awareness, possibly indicating a high level of health clinic usage. Community-level interactions with friends and relatives (n=87, 34.5 %) and neighbours (n=61, 24.2 %) were also deemed to be important sources of information.

Figure 23: Sources of information on AIDS



AIDS knowledge: symptoms; modes of transmission and prevention; cause; cure

When asked to name some symptoms of AIDS, respondents were able to name at least one symptom of the disease, and cited an average of 5 symptoms. The most common symptoms were skin disease, mentioned by 201 respondents (79.8 % of the sample), weight loss (n=179, 71 %), TB or persistent cough (n=132, 52.4 %), diarrhea (n=122, 48.4 %) and fever (n=106, 42 %).

Respondents again demonstrated a high level of knowledge and awareness when they were asked to name ways in which HIV may be spread. 252 people (100 % of the sample) responded that the HIV virus is transmitted through sexual intercourse, and on average, respondents cited 2 ways in which the virus is spread, including unsterilized/shared cutting instruments and needles (n=168, 66.6 %), blood transfusion (n=49, 19.4 %), mother to child transmission (n=30, 11.9 %), and other blood contact including wounds and accidents (n=28, 11.1 %). Relatively few respondents mentioned incorrect modes of transmission, such as kissing (n=7, 2.8 %) and drinking too much alcohol (n=3, 1.2 %).

When asked what a person can do to avoid getting HIV, respondents cited an average of 3 modes of prevention. Respondents' answers were in keeping with Uganda's ABC strategy for AIDS Control: abstinence was the most frequently mentioned method of prevention (n=222, 88.1 %), followed by condom use (n=185, 73.4 %), and being faithful to one's partner (n=94, 37.3 %). The ABC strategies were mentioned by similar proportions of males and females.

The sample again showed a high level of awareness of the disease when answering questions on the cause of AIDS, and whether or not AIDS could be cured. 170 people (67.5 % of the sample) knew that AIDS is caused by the HIV virus. 64 people (25.4 %) did not know the cause, and 18 (7.1 %) attributed it to other factors. Only ten people (4.0 %) thought there was a cure for AIDS. Of these ten, five respondents believed this cure to be ARVs, while four people cited spiritual/traditional healing as a cure.

Self-reported risk of HIV infection

When asked if they considered themselves at risk of getting infected with HIV, 137 respondents (54.6 % of the sample) said yes. Approximately the same proportion of males (53.5 %) and females (52.0 %) considered themselves at risk for HIV, but higher education level was significantly associated with feeling at risk. Mistrust of one's partner was the commonest reason for feeling at risk among women (n=42, 31.4 %), and men (n=13, 8.1 %). Not having been tested for HIV was considered a risk factor (n=22, 16.2 %), as was not using condoms (n=20, 14.6 %), being sexually active (n=14, 10.2 %) and thinking they were at risk of infection through cutting instruments (n=11, 9.5 %). "Other" reasons for risk were mostly concerned with giving into the temptation to have sex or to have sex without condoms, despite knowing how HIV is spread and prevented.

100 people (39.8 % of the sample) stated that they were not at risk of HIV infection. The most commonly cited reason was that they were abstaining from sex due to moral or religious beliefs, single status, etc (n=42, 42.0 %). Women were over twice as likely as men to report sexual abstinence. Trust of one's partner was commonly cited by both men (n=13, 29.5 %) and women (n=13, 20.3 %). Fourteen people (14.0%) who stated that they were not at risk reported that they are faithful in their relationships. Eleven people (11.0 %) plan to get an HIV test before marriage – this response was much more prevalent among men (20.5 %) than women (3.1 %). Having had a negative HIV test was perceived by nine respondents (9.0 %) to mean that they were not at risk. Additionally, eight respondents each (8.0 %) associated their low risk with using condoms (men were over four times as likely to report condom use than women) and abstaining from sex until marriage.

Awareness of AIDS control programs in Kabarole District

When asked if they were aware of AIDS control programs in Kabarole District, 237 people (94 % of the sample) replied yes, while fifteen people (6.0 %) were not aware. The most widely mentioned programs were AIDS education and awareness programs (n=144, 57.1 %), VCT (n=142, 56.3 %), prevention of mother-to-child transmission services (PMTCT) (n=95, 37,7 %), and antiretroviral drug (ARV) distribution (n=89, 35.3 %). Antenatal care was also mentioned (n=75, 29.8 %), although not surprisingly, mostly by women. Seminars and workshops (n=32, 12.7 %), treatment of AIDS-related illness (n=30, 11.9 %), treatment of STDs (29 respondents, 11.5 %), drama groups (25 respondents, 9.9 %), and condom distribution (22 respondents, 8.7 %) were also mentioned.

When asked how they had learned about the programs, once again, the most common response was through radio and television (n=208, 82.5 %), followed by health workers at hospitals and clinics (n=129, 51.1 %). Other frequently cited information sources were newspapers and magazines (n=34, 13.5 %), and schools and teachers (n=24, 9.5 %). Informal, community-based information sources were also mentioned: friends and relatives, and churches and mosques were each mentioned by 23 people (9.1 % of the sample).

3) Awareness of HIV prevalence trends

The most important results of the household survey show that the public is divided on whether HIV prevalence is increasing or decreasing in Uganda. The results of this section also provide detailed insights into the public's explanations for why they think HIV is declining or increasing.

HIV prevalence trends in Uganda since 1990

Initially, respondents were asked to comment on whether HIV prevalence in Uganda had increased, decreased or stayed the same since 1990. Nearly half the sample (122 people, 48.4 %) stated that HIV infection had increased in Uganda since the early 1990s. 113 (44.8 %) said it had decreased, while nine people (3.6 %) said that HIV infection levels had stayed the same. Women were more likely than men to say that HIV had increased (53.0% vs 41.6 %), and men were more likely to say that it had decreased (52.5% vs 39.7 %). Likelihood of saying that HIV prevalence had decreased went up with increasing education, while the lower education groups (secondary school and lower) were more likely to respond that HIV prevalence had increased since 1990.

Figure 24: Perceptions of HIV prevalence trends in Uganda since 1990

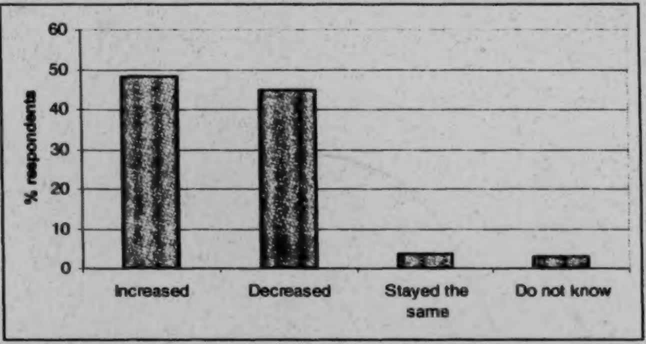


Figure 25: Perceptions of HIV trends in Uganda stratified by gender

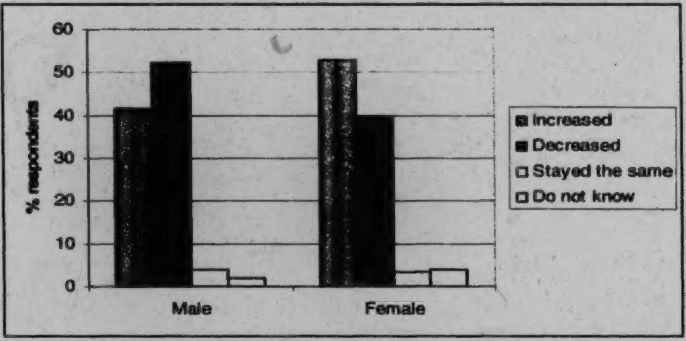
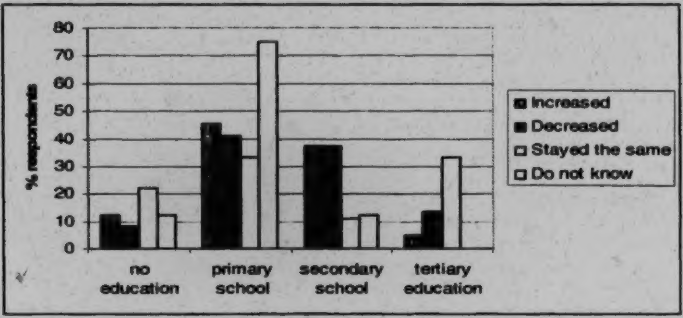
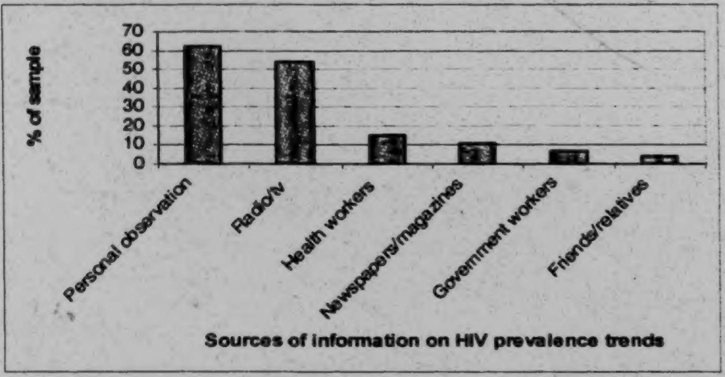


Figure 26: Perceptions of HIV trends in Uganda stratified by education level



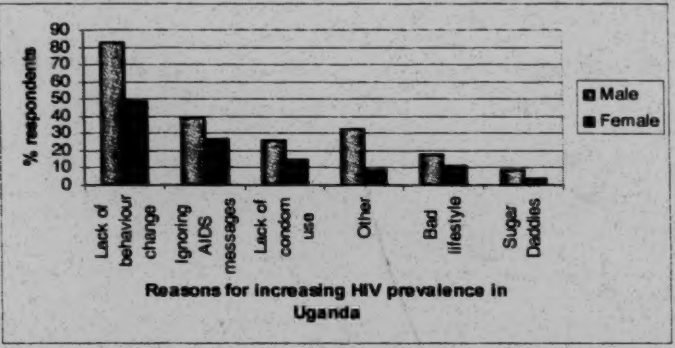
To find out which channels of information were most used in communicating HIV prevalence trends, respondents were asked how they had found out that HIV was increasing/decreasing. With regard to HIV prevalence, sources of information differed somewhat from sources mentioned by respondents in regard to general HIV/AIDS information. Personal observation (usually defined as seeing people sick with or dying of HIV/AIDS in the immediate area) was the most often mentioned source of information on HIV prevalence trends, reported by 157 people (62.3 % of the sample). Once again, radio and television were frequently mentioned sources (n=137, 54.4 %), as were health workers at hospitals and clinics (n=38, 15.1 %). Print media such as newspapers and magazines (n=28, 11.1 %), government workers (usually specified as those from the Ministry of Health) (n=18, 7.1 %), and other informal sources of information such as friends and relatives (n=11, 4.4 %) were also mentioned.

Figure 27: Sources of information on HIV trends



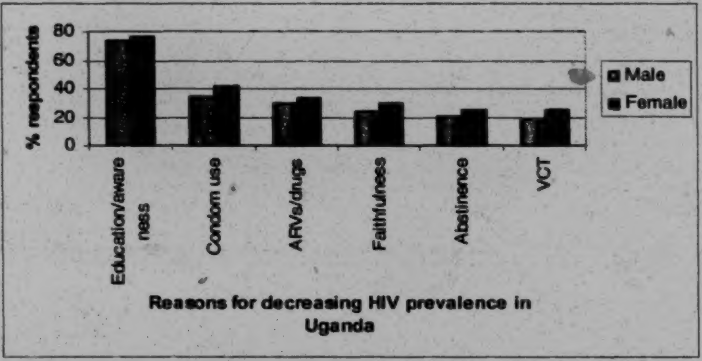
Survey respondents were then asked to explain why they thought HIV was increasing or decreasing. Of those who said that Uganda's HIV trend had increased or stayed the same, the most frequent explanation was lack of sexual behaviour change ("people are not changing", infidelity, multiple partners, rape, etc – 114 respondents, 93.4 %). Other frequent explanations included people ignoring AIDS control messages (n=59, 48.4 %), lack of condom use (n=35, 28.7 %), and "bad lifestyle" such as drinking and illicit drug use (n=25, 20.5 %). Sugar Daddies – men who entice young women into sexual relationships through promises of money or gifts – were cited by ten people (8.2 % of the sample). "Other responses" included intentional spread of the virus by HIV-positive people, the high cost of condoms which discourages their use, increased rape cases, and the problem of youth apathy and refusal to listen to AIDS control messages. Men were more likely than women to mention lack of behaviour change and lack of condom use.

Figure 28: Explanations for increasing HIV prevalence in Uganda



Of the 113 respondents who stated that Uganda's HIV trend had decreased, the decrease was most frequently attributed to AIDS education and awareness (n=85, 75.2 %). Respondents also frequently cited behaviour changes related to Uganda's ABC strategy (condom use: n=43, 38.1 %; faithfulness: n=31, 27.4 %; abstinence: n=26, 23.0 %). Thirty-six (31.9 %) of those answering that HIV had decreased cited the availability and use of ARV drugs as an explanation, while 25 (22.1 %) cited use of voluntary counselling and testing (VCT) services.

Figure 29: Explanations for decreasing HIV prevalence in Uganda



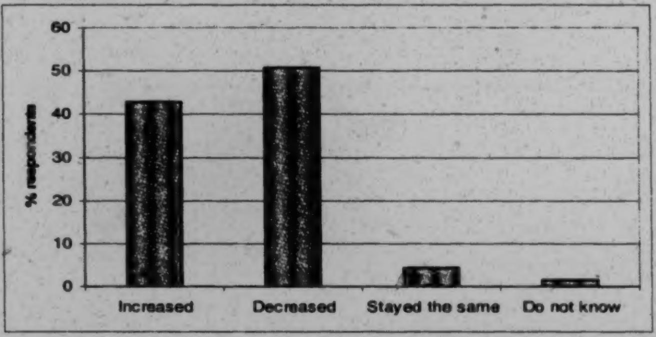
HIV prevalence trends in Fort Portal since 1990

When respondents were asked to comment on HIV prevalence trends in Fort Portal since 1990 and to give their explanations for these trends, respondents' answers did not significantly differ from their perceptions of the national-level trends. See Appendix I for specific responses regarding HIV trends in Fort Portal.

Other indicators of HIV trends

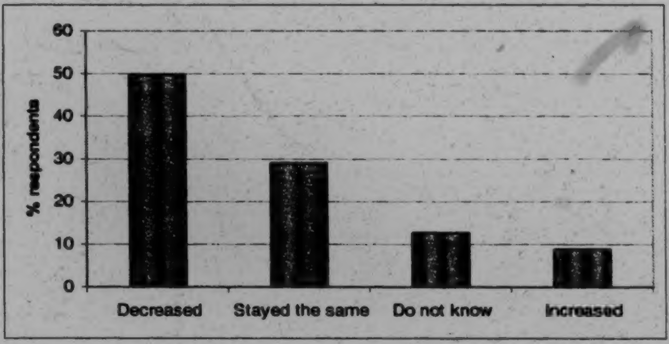
Both AIDS deaths and stigma against people with HIV/AIDS can be used as indicators of the severity of the epidemic. AIDS stigma in particular can influence the use of preventive services such as VCT and ARV drugs. Therefore, respondents were asked to comment on trends in AIDS deaths and stigma in the areas where they lived. Similar to HIV prevalence trends, the sample was more or less divided on the issue of AIDS deaths. Half of the 251 respondents answering this question stated that AIDS deaths had decreased (n=128, 50.9 %), while 108 people (43.0 %) stated that deaths from AIDS in their immediate areas had increased.

Figure 30: Trends in AIDS deaths since 1990



More consensus emerged regarding stigma against people with HIV/AIDS: Nearly half of the sample (n=125, 49.6 %) said that stigma had decreased since the early 1990s.

Figure 31: Trends in AIDS stigma since 1990



Respondents were asked about the influence of VCT and PMTCT services on HIV prevalence trends, as these are relatively new additions to the Kabarole District AIDS Control Program and could prove to be important tools for decreasing HIV prevalence in Kabarole.

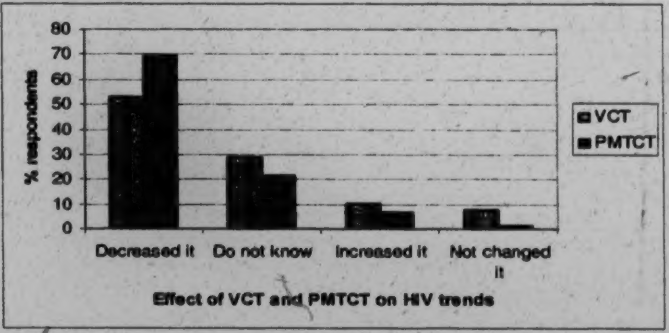
The influence of VCT on HIV prevalence trends

Awareness of VCT was high: 248 people (98.4 % of respondents) had heard of VCT. However, only 127 people (51.2 %) reported that VCT was being used in their community: this suggests that there is still a stigma attached to seeking an HIV test. However, 67 respondents (52.8 %) stated that VCT services had decreased HIV prevalence, while 13 (10.2 %) stated that VCT had increased the HIV prevalence, mostly because of a perception that those testing positive would subsequently receive ARV drugs and would resume their risky sexual behaviours.

The influence of PMTCT on HIV prevalence trends

247 people (98.0 % of the sample) had heard of prevention of mother-to-child transmission (PMTCT) services, and 142 (57.5 %) stated that PMTCT services were being used in their community. A positive view of PMTCT in reducing HIV was evident, as 100 people (69.9 % of respondents) stated that PMTCT had decreased HIV prevalence.

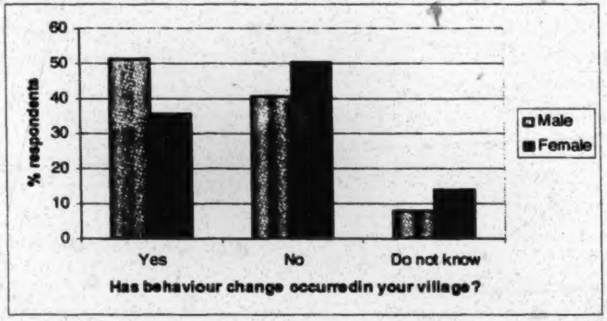
Figure 32: Effect of VCT and PMTCT services on HIV trends



The influence of behaviour change on HIV prevalence trends

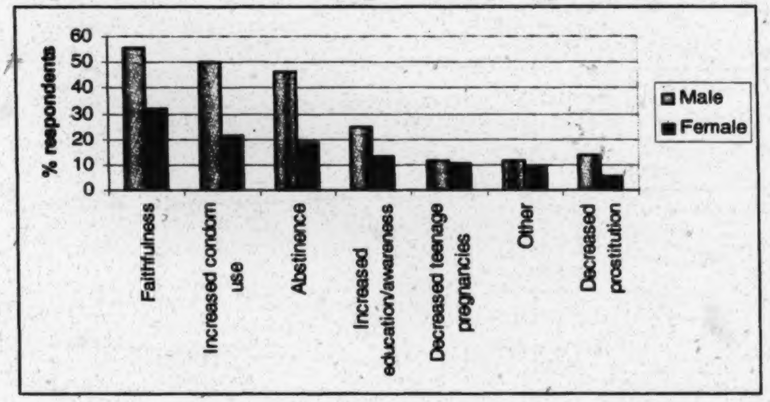
Respondents' explanations for prevalence trends were further explored as they were asked if behaviour changes had occurred in their villages. Only 106 of 252 respondents (42.1 %) felt there had been a change, while 117 (46.4 %) felt that behaviour change had not occurred. Men were more likely than women to say that behaviour change had occurred.

Figure 33: Respondents' opinions on behaviour change in their villages



Respondents were asked to elaborate by listing the types of behaviour changes they were seeing. Changes relating to the ABC strategy dominated the responses of the 106 people answering this question. The most common change cited was faithfulness (n=63, 59.4 %), followed by increased condom use (n=49, 46.2 %) and abstinence (n=44, 41.5 %). Interestingly, males were more likely to cite ABC-related behaviour changes than women. Increased levels of HIV/AIDS education and awareness, although not a direct behaviour change, were also mentioned by 27 people (25.5 % of respondents). "Other" behaviour changes included less people going to discos, VCT and PMTCT use, and a decrease in sharing sharp instruments. Some respondents also mentioned that prostitution and teenage pregnancies were down, indicating that behaviour change had occurred. It is important to note as well that some respondents felt that negative behaviour changes were occurring, such as increased prostitution, teenage pregnancies and intentional spread of HIV by people in the village. Additionally, some respondents added that behaviour change had occurred in adults, but that youth were still engaging in risky sexual behaviours.

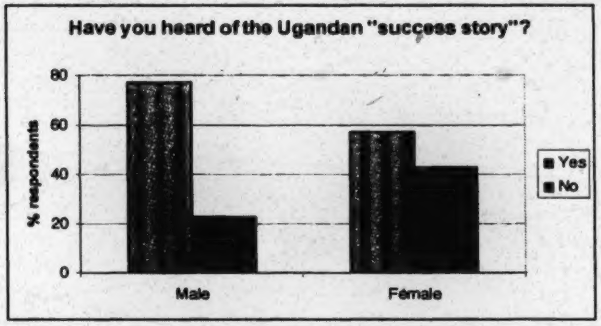
Figure 34: Behaviour changes seen by respondents



The Ugandan "Success Story"

After hearing an explanation of the Ugandan success story, 164 people (65.1 % of respondents) said they had heard about the Ugandan success story before, while 88 (34.9 %) had not. When comparing male and female respondents, it was noted that females were less likely to have heard about the success story than males, a fact likely linked to their generally lower education levels and reduced access to information.

Figure 35: Awareness of the Ugandan "Success Story"



Respondents who were aware of the success story were asked where they had heard about it. Once again radio and television were the most common means of hearing of the success story, and were mentioned by 154 people (93.9 % of the 164 respondents answering this question). The print media (newspapers and magazines) was also frequently cited (n=42, 25.6 %). Other means included government workers (n=36, 22.0%), newspapers and health workers (n=25, 15.2 %); both of which were more likely to be mentioned by men than women.

Of the 164 respondents who had heard of the success story, 112 (68.3 %) agreed with it, while 48 (29.3 %) disagreed. When respondents were asked to explain why they agreed or disagreed with the success story, their answers provided insights into the way Ugandans perceive their country's successes and failures in battling the HIV epidemic.

The main reason respondents agreed that Uganda has been successful in lowering its HIV levels was seeing less deaths from HIV/AIDS in the immediate area (n=49, 43.8 %), followed by the availability or low cost of ARV drugs (n=36, 32.1 %), and the increased HIV education and awareness programs that formed part of the national AIDS Control Program (n=33, 29.5 %). Other reasons for agreement included the quantity and quality of AIDS programs in existence (n=19, 17.0 %), and government support for AIDS control initiatives (n=12, 10.7 %).

Of the 48 respondents who disagreed with the success story, the main reason given was that the observed number of deaths from HIV/AIDS in the immediate area had stayed the same or had increased (n=37, 77.1 %). Other responses included the failure to find a cure for AIDS (n=8, 16.7 %), increased number of HIV infections (n=5, 10.4 %), inaccuracy of the published prevalence figures for Uganda, increased AIDS hospitalizations and lack of behaviour change (2 respondents each, 4.2 %).

104 (89.7 %) of the 164 respondents who agreed that Uganda had lowered its HIV prevalence rates showed strong support for existing AIDS control programs, stating that they should be further reinforced.

Satisfaction with information on HIV prevalence trends and recommended methods

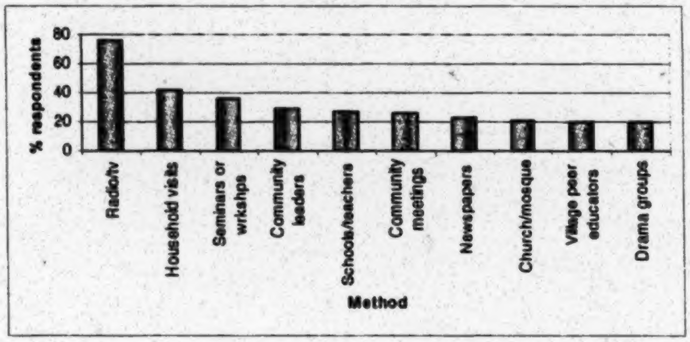
When asked if they were satisfied with the information they were getting from the government and other organizations regarding HIV prevalence, there was a nearly 50:50 split in opinion among respondents.

Of the 104 respondents who were satisfied, most explained their answer by citing their satisfaction with various sources of information such as radio and television (n=72, 69.2 %), health workers (n=23, 22.1 %), newspapers and magazines (n=23, 22.1 %), and schools and teachers (n=8, 6.7 %). Fifteen (14.4 %) of the respondents reported satisfaction with information in general.

Of the 107 respondents who were dissatisfied with HIV prevalence information, most cited dissatisfaction with their access to various sources of information. 29 (27.1 %) of the respondents stated that lack of access to radio (for themselves or others) due to low income or rural location could compromise receipt of information. Similarly, 11 (10.3 %) stated that these factors, coupled with illiteracy, compromised access to newspapers and other print sources of information, and 7 (6.5 %) stated that those who don't attend school, churches or hospitals will miss out on information. 25 respondents (23.4 %) and eight respondents (6.5 %) felt that not enough information was reaching them at the village and household levels, respectively. Nineteen people (17.8 %) expressed general dissatisfaction with information, while 13 (12.1 %) said they were disinterested or too busy doing chores and trying to make a living to pay attention to such information.

Finally, respondents were asked to suggest methods that the government could use to communicate information on HIV prevalence trends to the public. The answers of the 252 respondents coincided with previously preferred means of communication, with radio and television mentioned by 191 people (75.5 % of the sample). Grassroots or community-level strategies for information dissemination were also popular; these included household visits (n=106, 42.1 %), through community leaders such as LC1 chairmen (n=74, 29.4 %), community meetings (n=65, 25.8 %), village peer educators (n=51, 20.2 %) and drama groups (n=50, 19.8 %). Other more formal communication channels recommended by respondents included schools and teachers (n=69, 27.4 %), churches and mosques (n=54, 21.4 %), and ANC education (n=28, 11.1 %).

Figure 36: Recommended methods for communicating HIV prevalence trends



Results of the Focus Group Discussions

The following section describes the results obtained from the eight focus group discussions (FGDs) with 68 individuals from groups of health workers, traditional healers, youth aged 18-24 years, the West Post Test Club of Fort Portal (a group for HIV positive people), professionals based at the local government building Muchwa, and citizens considered "middle-class" from the Katumba A LC1.

Data analysis of the FGDs revealed several overarching themes in relation to the questions asked during the discussions. Each of these themes contained several subthemes, and linkages between the overarching themes and the subthemes were found, reflecting the interdependence of the issues discussed. The major themes and subthemes arising from the discussions are listed here:

Theme 1) HIV Prevalence Trends

Subthemes:
- -Awareness of trends
- -Explanations for trends
    - -Contextual
    - -Specific
- -Intentional spread of HIV
    - -by ARV patients
    - -by youth
    - -Prevention

Theme 2) Youth Behaviour and HIV/AIDS

Subthemes:
- -Environmental factors
- -Gender-specific behaviours
- -Sugar Daddies & Sugar Mommies
    - -At-risk groups
    - -Ways to prevent SM/SD exploitation
    - -Challenges to SM/SD prevention
- -ABC vs ABY
- -Challenges to youth behaviour change
- -Ways to motivate youth behaviour change
- -Behaviour changes seen among youth

Theme 3) The Ugandan HIV/AIDS "Success Story"

Subthemes:
- -Interpretations of the success story
- -Challenges to the success story

Theme 4) Methods for communicating HIV trends to the public

Subthemes:
- -Sources of information on HIV trends
- -Sources of information on the success story
- -Challenges to communication
- -Recommended methods of communication

Theme 5) Other themes

- -Supports for positives
- -ARV drugs

The themes and subthemes show that there is a high degree of awareness of Uganda's declining HIV prevalence trends, and of the Ugandan AIDS Control strategy (ABC). There is, however, a considerable amount of concern about youth's sexual behaviour that is putting them at risk of HIV transmission, although many participants gave examples of encouraging behaviour changes that are happening in the younger age groups. There was a feeling among FGD participants that the government should provide legal and financial assistance in reducing the problem of Sugar Daddies and others who intentionally spread the HIV virus, to regulate discos, and to provide a cure for AIDS (or at least a constant supply of ARVs to those who need them). Furthermore, respondents strongly voiced the need to reach out to those living in villages and those who cannot access conventional media such as radios, televisions and newspapers, in order to sensitize them about HIV/AIDS, to increase their uptake of VCT, and to communicate outcomes of AIDS programs to them.

Theme 1: HIV Prevalence Trends

Awareness of HIV trends

In general, participants largely felt that HIV prevalence had decreased in Uganda since the early 1990s. There were, however, some individuals who felt that it had increased, or that it had decreased but only a little; participants with this view were overwhelmingly female (including a majority of the female youth discussion group), similar to the findings from the household survey.

Explanations for HIV trends

Explanations for decreasing HIV trends ranged from the contextual to the specific. At the contextual level, many respondents cited the Ugandan political response to AIDS, which included a multi-sectoral AIDS control strategy, as being a contributor to decreasing HIV levels. This is apparent in the following quotes:

> *(Male Citizen): "...because the government and churches and education institutions have done a big job to see that they bring awareness among the communities. This has been a big step forward. You heard about the Catholic Church Bishops from all over Africa held a two-week conference in Uganda to fight against this thing."*
>
> *(Male Professional): "Because, uh, the government policy is very clear on AIDS, to an extent of making a secretariat in Kampala, fully funded, up to the, the District level."*
>
> *(Female Professional): "For instance, there are even policies, the government has come in to enforce in schools...when we are going with the...sports women and men together...the girls should go with senior women, a lady, there must be a lady to accompany them."*

Specific factors such as sensitization through churches, schools and NGOs, drama groups and testimonials by HIV-positive people were also given as explanations for the decreasing HIV trends. It was felt that this sensitization had led to reduced stigma, increased knowledge and awareness resulting in decreased HIV prevalence trends:

> *(Male Youth): "Many of the organizations have come out to sensitize the community, for example Straight Talk, AYA, and other organizations and this helps us to continue preventing ourselves."*
>
> *(Male Citizen): "Therefore these days we have improved, we no longer have that stigma and we no longer die as in the past when we were dying out of ignorance."*

Specific services such as VCT, PMTCT and ARVs and other treatments for AIDS patients were also seen as contributing to the decrease in HIV.

> *(Female Traditional Healer): "The reason I look at it as why it has decreased is how women are producing two or three kids and they don't die, but in the past they used to die after producing one child [PMTCT]."*
>
> *(Male Citizen): "When someone goes for check up and finds out that he is infected, he straight away joins TASO and he starts taking drugs. After that he becomes more careful and takes serious preventive measures in order not to be re-infected."*

Behaviour change was also frequently cited as an influence on HIV trends, usually in the context of the elements of the ABC strategy: sexual abstinence, faithfulness and condom use.

> *(Male Professional): "At the end of the day, people were aware that AIDS is there and they have tried how to control themselves, at least, those one who are reckless, they go they use condoms. Others, I think in the schools they are encouraging abstinence, they are doing that one, and they are seeing good results so far."*

> *(Male Youth): "This disease has gone down because they have tried to fight against it in different ways. Because we hear them encouraging us, saying that you as youth when you want to involve yourselves in such activities, you should use condoms or you should abstain."*

Both behaviour change and ARVs, however, were mentioned as negative influences on HIV trends by those who believed that HIV had increased. Examples were intentional spread of HIV by ARV patients, ignorance in the use of ARVs and reckless youth behaviour:

> *(Female Citizen): "There are some children who don't care and they don't follow the advice given to them on preventive measures. I think that is the reason why the disease is going up."*

> *(Male Citizen): "Those people who are on drugs are still producing children outside their families, you see. How are they protected? And getting drugs does not mean that you cannot infect somebody else. And when you tell me...that the disease is decreasing, I don't support that."*

> *(Female Youth): "When he goes and takes these drugs and...he mixes these drugs with alcohol and the drugs do not work. Therefore the disease has increased because the people are ignorant."*

Another theme that emerged regarding HIV prevalence was the public's disregard of AIDS control messages, despite efforts to sensitize them:

> *(Female Health Worker): "Maybe it [the stagnating HIV prevalence in recent years] could be because of complacency, maybe people initially were taking up the messages, but now...people are not...adopting the prevention messages."*

> *(Male Youth): "Whenever you try to advise some people, they refuse."*

Intentional Spread of HIV

Many participants in all the FGDs felt that intentional spread of HIV was a problem that needed to be addressed in order to lower HIV prevalence rates.

This was an overarching theme that was often framed in the context of apathy (a "don't care attitude"), ignorance, and even maleficience.

Intentional spread by those on ARVs

ARVs, although frequently mentioned as a reason for the HIV decline, were implicated in the exacerbation of HIV/AIDS, for the reason that some respondents felt that patients on ARVs were responsible for intentionally spreading the disease. This was generally described as ARV patients "fooling" others into thinking they were HIV-negative due to their healthy appearance, and having unsafe sexual relations with them:

> *(Female Youth): "...because there is no way you can tell who has the disease and who does not have it. They brought drugs and after taking them one looks very healthy and you cannot identify him from other people who are not sick. So they infect other people thus the increase in the disease."*
>
> *(Female Citizen): "...because they brought the drugs which make somebody look very, very healthy, and there are many people who are bad-hearted people and you just sleep with him when he's already infected and you are also infected."*

The issue of marriage or re-marriage by infected people on ARVs was often raised in the discussions of intentional spread, because of the perceived importance of testing for HIV before marriage and the preference for an HIV-negative partner over one who is infected:

> *(Female WPTC): "And another problem we have is to say that when you take these drugs (ARVs) for a long time, when you go back for screening you find you are negative. If there is someone who wants to marry me and I have now spent three years taking ARVs, they will automatically find me negative, and in the end I will have already infected him."*

Intentional spread by youth

Intentional spread of the HIV virus by infected youth reportedly occurs and was considered to be a problem, especially by the youth FGD participants. Male youth were most often described as those who transmitted the virus intentionally to others:

> *(Male Youth): "Me I'm saying that we the youth have also contributed to the spread of this disease because after getting it...[we] start infecting other people."*

> *(Female Youth): "...there are other boys who know that they are infected and when he is to meet with you and you ask him to use a condom he accepts but in the end he removes the condom or he breaks its head."*

Maleficience, or an intention to do harm to someone else, was also reported to be an element of intentional spread. This is a discouraging finding that could also suggest a mistrust of or stigma against HIV-positive people.

> *(Female Youth): "...when [intentional spreaders of HIV] see girls going to school feel envious and they do not want these girls to continue with their studies. They know they are infected and want to infect these girls with the disease so that they do not go far."*

Ways to prevent intentional spread

One possible solution raised by members of various groups was finding some means of identifying HIV-positive people. ID cards were mentioned by some respondents:

> *(Male WPTC): "Now what we are requesting for is that...the people who are infected should be given a confidential card to show that he/she is infected. This card should be used, for example, if you meet a foreign person, you show him/her the card and one should be able to ask, "what is your HIV status"? Then if someone does not have the card to identify him or her as being infected or not, then that will show you that the person is infected or not infected, because prevention is better than cure."*

> *(Female Citizen): "So for me I was saying that can't there be a way how these people who are HIV positive and are on drugs could be identified so that people can know that such and such a person is infected?"*

Arrest of intentional spreaders of HIV has occurred in Fort Portal according to some respondents. Participants were largely supportive of arresting and incarcerating those who intentionally transmit the virus. This indicates their perception of the seriousness of the problem.

> *(Male Citizen): "For me I am suggesting that these women [whose husbands have died of HIV] who are selling their bodies and doing it as a business should be arrested and be made to pay a fine, because they are the ones contributing to the rampant spread of HIV/AIDS."*

Prevention of intentional spread through sensitization and supports for HIV-positive people was also mentioned by several respondents. Since statements regarding supports for positive people are interlinked with other strategies to decrease HIV in Uganda, they will be listed later in this section.

Theme 2: Youth Behaviour and HIV/AIDS

Youth sexual behaviour was an overarching theme of the FGDs. Youth behaviour was felt by participants in all groups to have a significant influence on HIV trends in Uganda, as well as the success story. Six sub-themes were defined regarding youth behaviour: environmental factors, gender-specific behaviours, Sugar Daddies and Sugar Mommies, ABC vs ABY, catalysts for youth behaviour change, and observed behaviour changes in youth.

Environmental factors

These were themes touched on by FGD participants that describe the home and school environment experienced by the youth which in turn influences their sexual behaviour and HIV risk.

Parents' Role

Parents were thought to have a significant role to play in shaping youth sexual behaviour. They were also given a significant part of the blame for the negative behaviours reported by FGD participants. Generally a lack of guidance or action on the part of parents was looked upon negatively, as was setting a bad example through behaviours such as polygamy.

> *(Female Youth): "This sometimes comes about as a result of some parents from villages who rent houses in town for their children. These children stay alone without anybody looking after them and they end up joining night clubs and other bad groups of boys who in the end infect them with the disease."*

> *(Female Youth): "Parents also are in the wrong. They do not discipline their children. Girls put on short skirts when their parents are seeing it and some parts of their body are left naked..."*

> *(Female Citizen): "More especially we parents, we have to take our responsibility and we should no longer be shy as how they used to talk about Africans that we don't talk with our children about sex. We have to start talking about these things with our children."*

> *(Male Youth): "Sometimes our parents are also acting as an example, because you find that a parent is practicing polygamy... You also decide to do the same thing."*

Peer pressure

Their peers can strongly influence youths to adopt sexual behaviours that put them at risk for getting HIV. This sentiment was strongly expressed by the FGD participants.

> *(Male Professional): "...there are others when they join peer groups, most specifically peer groups, the peer group will tell a friend aah aah, you are missing a lot, do this [get a Sugar Daddy]."*

> *(Male Youth): "We as youth, you can find that when you are at home, you are a well-behaved person. But when you join your peer groups outside there, they start persuading you and you end up doing bad things. This does not depend on your family background, you are just misled by your peer group to do bad things."*

> *(Female Youth): "When these girls drop out of school and they see other girls maintaining themselves and dressing very well, they also decide to leave school thinking that maybe boys will also buy good clothes for them and they end up being infected by these boys."*

Gender-specific behaviours

Girls' Behaviours

Girls were criticized for their scanty dressing and attempts to entice boys to sleep with them in the aim of getting money; this was seen as girls' role in contributing to increased HIV transmission among youth. Participants did not emphasize boys' responsibility to restrain themselves in these situations, but rather portrayed them as unable to resist their sexual urges. Most criticism of girls' dress and conduct came from females, suggesting that the social value of modesty for girls and women can override the question of women's sexual exploitation and rights.

> *(Female Youth): "The way the girls put on forces the boys to feel bad and they are persuaded to rape the girl because of the way they are dressing in short skirts."*

> *(Male Citizen): "If she sees a boy has money, that is the one she will go with and when the money gets finished, she decides to go to another boy who has the money and girls do not care about their life and all about it. That is how they are."*

> *(Female Citizen): "In my opinion, in Africa, the boys take it as pride to see that he has so many girls. The boy feels very happy, more especially when the girl*

> *is very beautiful, to find that he succeeds in befriending this girl, the boy feels very proud."*

Boys' Behaviours

Drug and alcohol use was the most consistent theme arising around male-specific youth behaviour, although discos and video parlours were also often mentioned. Drug and alcohol use was seen to cause boys to engage in risky sexual behaviours such as rape, contributing to the increased transmission of HIV among youth.

> *(Female Youth): "...sometimes, when people take a lot of drinks, they intend to go in for sexual activities under the influence of alcohol and they go and infect others."*

> *(Female Youth): "Boys have also contributed to the increase in transmission because after taking the marijuana they waylay girls on their way home from school and rape them."*

One of the exacerbating factors of youth drug and alcohol use as stated by FGD participants was idleness:

> *(Male Citizen): "When the youth don't have anything to do, they just form groups... and they start eating mairungi and smoking marijuana and the end result of this is to go and start involving themselves in sexual activities and when one youth goes and loves one girl he comes back and tells his colleagues...and in the end all the youth end up using this one girl. If the girl is infected, she will end up infecting all the boys who have moved with her and this contributes to the spread of the disease..."*

Sugar Mommies/Sugar Daddies

Sugar Mommies and Daddies (SMs/SDs) are adults who coerce adolescent (or younger) boys and girls into sexual relations with them through offering them gifts and money. The risk of HIV transmission from these relationships is significant, as the adults are frequently divorced or widowed, and may not be considered desirable to other adults. This was a theme connected with both youth behaviour and the intentional spread of HIV, and was often framed in the context of poverty, as poor youth who are desperately in need of financial and material support can be easily taken in by SMs/SDs.

At-risk groups

Girls were perceived to be most at risk of intentional HIV spread by SDs, but poverty-stricken youth of both sexes were mentioned. Female students were seen as being particularly vulnerable because of their need to pay school fees:

> *(Male Youth): "For the case of having Sugar Mommies, most of us don't have enough...enough things for...maybe you lack school fees, or something like that you can be lacking, so when you get a Sugar Mommy...[she can support you]."*
>
> *(Female Health Professional): "...[in] adolescents ages 15-24 years the ratio of [infected] girls to boys is 4 to 1 really. And why is that? And one of the reasons is maybe that girls get married to the older, infected men."*
>
> *(Male Citizen): "Old men have money and the young girls are poor and they need money. So the infection increases because of sexual activities."*

Ways to prevent SM/SD exploitation

Some respondents favoured legal consequences for SMs and SDs, and others favoured more informal means of discipline.

> *(Male Citizen): "Expose them and flog them."*
>
> *(Female WPTC): "Me, I was thinking, that if we had power, we could arrest those Sugar Daddies who are trying to kill our children. Then that's what should also be done with the Sugar Mommies. These people should be jailed."*

The government's role in reducing SM and SD exploitation was also highlighted in terms of alleviating the financial burden on students who otherwise would be vulnerable:

> *(Female Youth): Me I'm saying the government should... help us, to give us...some things, we the youth, so we don't be attracted... Like, like school fees, mostly school fees."*

Education and empowerment of youth were also mentioned as tools to enable young people to resist the temptations of SMs and SDs:

> *(Female Health Worker): "I think what we need is to empower these girls with more skills like assertiveness against somebody comes and they entice you with this and this but know really what he wants and be able to shake off. Whatever you feel is not right until you feel maybe it's the right time. Basically life planning skills."*

Challenges to the prevention of SM/SD exploitation

Although the consequences of having a SM or a SD were undisputedly felt by FGD participants to be negative, there was also a subtheme of youth complicity with SMs and SDs. Participants felt that, due to poverty, the youth would accept the physical and emotional risks of relationships with SMs and SDs in order to reap the benefits of the material and financial support being offered:

> *(Male Youth): "Most of our youth are saying that at least you get...a shorter life, but enjoy it."*
>
> *(Male Youth): "This is happening because also when the Sugar Mommy...has her money, you'll not refuse!"*
>
> *(Female WPTC): "Young girls are no longer disciplined because you also find them in the villages, in their groups, talking amongst themselves, that "when I go with my Sugar Daddy, he says that we should not use a condom". Our children who are very young have been spoilt by sugar daddies."*

Poverty was seen as another challenge to preventing exploitation by SMs and SDs:

> *(Male Youth) "It's very difficult to stop it...because some of the people are not good financially and there's no way how you would stop him or her because if at all it happens and he get or she get a Sugar Mommy or a Sugar Daddy he or she may help him or her, so that one, I think, it is not easy to stop it. Because we the youth, some of them, they're after money."*
>
> *(Female Health Worker): "And [SMs and Sds are] very common in urban cities where I mean life is driven with money and these are the people who can afford..."*

ABC vs ABY

The ABY strategy, or "Abstinence and Be Faithful for Youth", is a strategy for HIV prevention among youth that has been heavily promoted by the U.S. Government and the Catholic Church of Uganda in recent years (Human Rights Watch 2005, and personal communication, Kemigabo Catherine, 2005). This strategy promotes and provides education on abstinence and faithfulness, but does not encourage condom use among youth. FGD participants were asked to state their preference between ABC and ABY, and to comment on whether it is realistic to expect youth to abstain from sex until marriage. Opinions were divided about ABC vs ABY, but a slim majority of respondents felt that the ABC strategy was more realistic and would work better overall in the prevention of HIV.

> *(Female WPTC): "Because a human being was created, and that this [sexual intercourse] was also created. I think there is nobody who forces anyone to do that thing, but it comes by itself. Nobody brings it about, or else you advise them to use condoms. If you say that they should stay like that, they will then start doing this thing secretly and they will all die."*
>
> *(Male Health Professional): "That one [ABY] is not realistic, because it won't work."*
>
> *(Male Citizen): "So even if condoms are not provided and we tell them abstinence, they will still go secretly."*

Interestingly, most supporters of ABY were males, and in particular, male youth; this could indicate that these youth have carefully considered their sexual decisions and understand the impact that HIV infection could have on their future, marriage prospects, etc. However, other motivations such as mistrust of condoms and fear of infection were given as reasons for support of ABY by youth and adults alike.

Challenges to youth behaviour change

The major challenge to youth behaviour change was seen as being apathy, a general disinterest in changing behaviours:

> *(Female Traditional Healer): "But these children growing up, maybe their parent died of AIDS, but when we give them medicine and they improve we try to advise them to abstain and prevent themselves against AIDS. We tell them that if they can't abstain, then they should use condoms. But these children are not paying heed to the advice..."*
>
> *(Female Youth): "There are other children whom parents advise to leave groups and that they will end up dying. But the children tell them "did this disease come for trees" [meaning that contracting HIV is inevitable]. That is why this disease is increasing, just because the youth cannot listen."*
>
> *(Male Traditional Healer): "The youth today...we parents who have these boys and girls, what can we do? Because when you try to talk about them, they say they are going to take you to the courts of law [laughs]."*

Motivations for behaviour change

Motivations mentioned by FGD participants for youth to change their behaviour included fear of AIDS after having seen their friends and relatives die of the disease; and increased sensitization and education for the youth.

> *(Female Youth): "Like some of us girls, you find that we have lost both our parents and you see that the cause of your parents' death is HIV. And you see that you have remained with your young sisters and brothers and you ask yourself who will look after these when you also fall sick."*

> *(Male Youth): "...because when we attend seminars, and uh, this sensitization of masses, we get enough knowledge."*

Behaviour changes seen in youth

Despite the challenges of changing youth behaviour raised in the FGDs, many participants (both youth and adults) felt that the youth were changing their sexual behaviours in a positive way. The Traditional Healers, however, generally felt that the youth were not changing. The dominant behaviour changes reported by FGD participants were changes related to Uganda's ABC Strategy (abstinence, be faithful, and condom use). Other changes included postponing first sex and increased uptake of VCT.

> *(Female Youth): "If the boy is not faithful to me then I can decide to abstain of if I get another one I will tell him to use a condom."*

> *(Female Professional): "...the youth are really moving on a positive trend, cause these are the virgin people who have been, who are aware...of the causes, eh? And these are the very people who are using the condoms."*

> *(Male Health Professional): "...in that the youth still have play [inaudible] sexual relationships but then, they do it in a safer way by using condoms. And they think with the [inaudible], most of the condoms that are being consumed are being used by youth."*

> *(Male Professional): "Most cases the girls thought that to make a boy happy, a man happy is through sex intercourse. But today, they say no. They are assertive. And that's a real achievement at best."*

Peer groups, whose negative influence on youth sexual behaviour was described previously, were also seen as a potentially positive influence on behaviour change:

> *(Female Professional): [Regarding VCT uptake] "Because the youth, they are vigilant, they are energetic, they are inquisitive, and they are determined. And*

> *because of that, once you have told them something, they want to go in and find out, are determined to do that thing. And when they go, they disseminate the information to their peer groups, the youth. The other youth, because of the vigilance they have, they feel they are determined to go and teach others."*

Theme 3: The Ugandan HIV/AIDS "Success Story"

Interpretations of the success story

A definition of the Ugandan 'success story' (that Uganda has successfully lowered its HIV prevalence) was given to all participants prior to discussing this topic. Virtually all FGD participants had heard of and agreed with the Ugandan success. Participants were then asked how they themselves defined the 'success story'. Similar to the household surveys, elements of Uganda's AIDS Control Program dominated FGD participants' definitions of the Ugandan 'success story':

> *(Male Citizen): "Another one I can see that the success is there, there is a provision of getting these anti-retroviral drugs which can reduce the disease up to a certain period where people can buy it at manageable price."*

> *(Female Citizen): "For me the success story I am seeing in the fight against this disease is that the government has provided many free drugs and they have told everybody to go for check-up in order to know their HIV status and in many cases patients are provided with some free things to assist them and to assist orphans."*

> *(Female Professional): "It is a cutting, a cross-cutting issue. And, multi sectors, so it is called a multisectoral, cross-cutting issue. So there is no way we shall leave stones unturned, which Uganda has done...and that one has brought success."*

Challenges to the success story

Although virtually all participants agreed that Uganda has been "successful", most felt that there was still a lot of work to do in the country with regards to reducing HIV/AIDS. The foremost theme in this area was that of ignorance and complacency on the part of the public, indicating that participants valued Uganda's efforts but did not have as much faith in the public's uptake of information and services. Related to this was participants' view that behaviour change had been slow to occur, despite efforts on the part of the Ugandan government and its partners in AIDS control. Social issues such as poverty, polygamy, prostitution, stigma and intentional spread of HIV were also cited as challenges to Uganda's continuing success in lowering its HIV prevalence.

> *(Female Citizen): "Therefore Uganda as a country has played its part in informing the public on preventive measures, except the problem is still that people are ignorant."*
>
> *(Female Citizen): "...it has provided assistance to almost everybody except that the people have refused to make a choice on what to do, and they are still many who have refused to go for check up, up to now."*
>
> *(Male Health Professional): "I think also that it is one thing to give information because we have reached many people, and it's quite another to change behaviour. You know AIDS is very much around here. So many people might have that information, but have not yet all taken [inaudible]. It's dreadful."*

Theme 4) Methods for communicating HIV trends to the public

Sources of information on HIV trends

The FGD respondents cited many of the same sources of information as the household survey respondents, with radio topping the list. Health workers were frequently mentioned as sources of information on HIV trends, as was personal observation of AIDS-related illness and death.

> *(Male Youth): "Now, when you see the villages where we are staying, when you switch on Straight Talk radio programmes and you listen to them, When that programme is on air he calls you and he explains to you..."*
>
> *(Male Citizen): "...we even see people who visit clinics, which are near us. They come to collect drugs..."*
>
> *(Female WPTC): "Ok...there are times when we have gone for seminars or workshops like those where we find doctors and they tell us that the disease is still on a high trend."*
>
> *(Male Traditional Healer): "Health workers, church leaders also tell us, and we as community leaders also tell other people."*
>
> *(Male Youth): "We get that information from the villages where we stay. Because in the past you would find 4 or 5 people bedridden. But these days, it is very difficult to recognize that somebody has HIV/AIDS."*

Sources of information on the success story

In discussing how they had become aware of the Ugandan 'success story', participants mainly mentioned the same sources of information they had used to become aware of the HIV prevalence trends. Once again, the media (radio, television and newspaper) were frequently mentioned, as were visits to hospitals where health workers informed them of Uganda's success. Personal observation, however, was not a significant source of information, probably because participants recognized the national-level significance of the success story and did not link their local observations with this.

> *(Female Youth): "We get information when we go for seminars, or from programmes about HIV/AIDS on Voice of Toro [the local radio station]."*

> *(Female Youth): "When we have gone to hospitals. Sometimes nurses and other people who come to visit schools teach the youth who are there what is going on in the country as far as HIV/AIDS is concerned. Those in the village get information when they visit government hospitals. Those people are explained how the situation of HIV/AIDS is in Uganda."*

Challenges to communication

When participants were discussing their satisfaction with the information that had been given to them regarding HIV prevalence trends and the Ugandan 'success story', many individuals voiced concerns. Although many were happy with the information they had received, communication was often thought to be inadequate for people living in villages who did not have easy access to health centres or radio programmes, the illiterate who could not benefit from print media such as newspapers, and the challenges of reaching the uneducated, or out-of-school youth. The media was also criticized for being driven by political or financial interests rather than the need for disseminating accurate health-related information.

> *(Male Health Professional): "...the flow of information is slow and it is not reaching everybody at the same time. So whereas x here in this office can get that information, y in another office is very ignorant. So when we're talking of generalizing, we are not really getting the information...and if you put it on radio not everybody will listen because there are many other radios [radio stations] here."*

> *(Male Health Professional): "Maybe the reading culture...here...is not so high. So, some of the IEC materials, especially for reading, will not be...will not be read so much..."*

> *(Male Health Professional): "The press you find they have their own interests, uh? And most of the time you find they put more political issues than some of these educative matters. So, I think that people who own the newspapers, who own the radios, uh, they normally talk things which are, which are in their own interest."*

> *(Male Professional): "Uh, ok the other one is the one which is already existing of the communication using print media and radio. However, uh, it may not trickle down to the communities."*

An interesting point, raised by one respondent, engages the topic of appropriate risk communication to the public:

> *(Male Health Professional): "And it has not been actually culture to disseminate a group and say: look, HIV problem is becoming less, because that would make people reckless. So [inaudible], we have to keep saying the problem is big, and we must keep alert, so that you're not caught."*

This statement raises the dilemma of whether to tell the public that HIV is on the increase, which essentially misleads them, but could have the advantage of motivating them to keep up HIV preventive behaviours, or to tell them what is really going on and run the risk of "[making] people reckless". This is a debate that could be engaged in further studies on this topic.

Recommended methods of communication

The most prevalent theme here was the perceived importance of grassroots, or village-level communication. Respondents from all groups felt that this was an essential element in informing people about HIV prevention, HIV prevalence trends and Uganda's success story. Media such as radio, television and newspapers were also favoured dissemination methods due to their wide audience, accessibility and cost-effectiveness.

> *(Female Professional): "And also at one time or another, a family or maybe a neighbour or a friend could have contracted that disease and you know it's a disease that doesn't kill in a day. People would have seen that person and they would be interested to know why the person is sick and what they are suffering from. If there's enough communication for everybody, even for the grassroots person...they know..."*

> *(Female Professional): "They should go from home to home. Household to household, giving information, and also giving some small packages. For instance, if they came to my home, I may be lacking some sugar, they tell me, and they give..."*

> *(Male Traditional Healer): "Me, the advice I would give, is to start from the grassroots, those who are not able to go for seminars at the parishes and at the subcounty headquarters, they should find them in their villages and inform them..."*

The importance of including youth in information dissemination was also stressed, as youth were seen to have a need for information and a great capacity to share and pass on the information received:

> *(Female Professional): "...maybe they're using the youth, especially those in schools, so the government would go through the schools, would train the youth...we should convince these youths to go back to home, they tell their parents, they tell their sisters, and I'm sure the message would reach..."*

Theme 5: Other themes

ARV Drugs

Anti-retroviral drugs were seen as a major contributor to Uganda's lowered HIV prevalence by the vast majority of respondents. Even the Traditional Healers spoke highly of ARVs and considered them the first line of treatment for AIDS patients. Among those who linked ARVs with intentional HIV spread, the drugs themselves were most often not criticized; rather, it was the supply of drugs and people's misuse of them that drew criticism. For this reason, many participants stressed the government's responsibility to provide an adequate supply of ARVs, and the need for sensitization on the proper use of the drugs:

> *(Female WPTC): "...and we request the government should reduce on the cost for these drugs, so that each person who is checked and found positive should receive the drugs."*

> *(Female WPTC): "...what we are fearing is that what will happen when these drugs become out of stock and where shall we go? Now, the government should put in more effort to make sure that these drugs are stocked so that other people who are coming out should start taking these drugs ..."*

> *(Female WPTC): "Sensitization seminars on the usage of these drugs should continue because there are so many people who are still fearing to be started on these drugs."*

Supports for positives

Prevention activities for people who have already tested HIV-positive are often overlooked, but are an important part of AIDS control. This was a theme that was raised especially by the members of the West Post Test Club, who of all the groups would have the greatest amount of insight into the issues faced by HIV-positive people. Supports for positives were discussed in relation to decreasing intentional spread of HIV, and by extension, decreasing HIV/AIDS in Uganda. Specific aspects of support included sensitization on the ABC method of HIV prevention, maintenance of general health for positives, home care, and rights of HIV-positive people.

> *(Male WPTC): [Statement in relation to assisting prisoners who are positive] "We have a problem as far as government laws are concerned whereby you find a person maybe he is already infected, but when he does anything wrong, he is taken to prison like that one at Katojo. This person is made to dig as a horse when he is already very weak and you can see it clearly that this person is infected. Sometimes they just arrest people as suspects and this problem is being faced by so many HIV positive patients."*
>
> *(Male Traditional Healer): "And then to sensitize people to practice good feeding. If somebody has diarrhea and doesn't eat well, this one may lead to death."*
>
> *(Female Health Professional): "The programs for prevention of HIV among positives are really coming up and taking a toll with things like either abstinence, condom use, within or without the marriage and...the peer social support groups... campaigns for prevention among them [inaudible] but it's still not very very popular but at least we encourage it especially in the ARV clinic and the post test club, including the groups which deal with people having HIV."*

Chapter 5: Discussion

Discussion 1: HIV prevalence trends in Kabarole District

By providing data on HIV prevalence trends and change in HIV risk in semi-urban and rural Kabarole District, this study complements and expands on previous research that has described the nature of Uganda's evolving HIV epidemic.

Although no concrete explanation could be found for the large peak in HIV prevalence in the urban site in 2001-2002, possible reasons could include sampling issues such as an extreme self-selection of the ANC attendee population, or the fact that the sample size of the database is so large that small differences could appear significant, although they have no practical implication. Despite these possible explanations, the unrealistic nature of the 2001-2002 HIV test results suggest that the data was incorrectly coded or entered.

The results of the bivariate analysis show decreasing crude HIV prevalence trends among pregnant women in urban areas. Encouragingly, these results also provide indications that HIV prevalence is declining in non-urban areas of Uganda. Univariate logistic regression analysis confirmed this, showing declines in HIV risk over time in every site except for early semi-urban. In multivariate analysis, after adjusting for marriage, age, occupation and education, HIV risk decreased over time in all but the early and late urban and early semi-urban sites. However, except for the early rural site, none of the odds ratios were statistically significant in the overall multivariate model. Stratified analysis provided a more detailed understanding of changes in HIV risk over time, and revealed that the decline in HIV prevalence and HIV risk was most pronounced in pregnant women aged 25 years and less, and especially among women aged 15-19 years in all sites.

The fact that the urban sites did not show a statistically significant change in HIV risk over time differs slightly from previous findings from Kabarole District and other parts of Uganda that have reported decreasing HIV prevalence among pregnant women in urban sites of Uganda (Asiimwe-Okiror 1997, Kilian et al.1999). This could be due to differences in the characteristics of the ANC populations being studied, or the methodology used: specifically, the covariates adjusted for in multivariate regression models could differ between studies (if indeed multivariate models were used), and this could impact the predictive effect of time on HIV status. Furthermore, the adjusted odds ratios for HIV risk over time do not measure HIV prevalence over time.

Even so, there is little doubt that HIV prevalence and HIV risk have declined in all three geographic strata of Kabarole District. The question of how to interpret these declines, however, remains a complex one. The stratified univariate and multivariate logistic regressions provide some insight, allowing a deeper investigation of the relationships between HIV status and the variables site, education, age, marital status and occupation.

Site

Women in urban areas had the highest risk of HIV infection, and although the decrease in crude prevalence was most marked in the urban site, prevalence levels were higher than the semi-urban and rural sites. Women in rural areas had the lowest risk of HIV infection; however, their decrease in crude prevalence was the smallest. The large decrease in the rural sites in the early 1990s followed by a much smaller decrease from 1995 onwards is typical of an environment where prevalence is low to begin with. Those in the semi-urban sites had an HIV risk intermediate between rural and urban sites. This gradient of risk from urban to rural is not surprising, as there is a higher amount of travel, trading and mobility in more urbanized centres, as well as a more widespread presence of commercial sex work. Migrant populations that have contributed to population growth in urban centres and the sex imbalance within migrant populations have also increased the vulnerability of city dwellers to HIV/AIDS (Mann & Tarantola 1996).

These factors may also explain why, in multivariate analysis, the risk of HIV was found to decrease more over time in the semi-urban and rural sites than in the urban sites. However, these findings should not result in a neglect of rural areas in targeting HIV/AIDS interventions. In Uganda, where most of the population lives in rural areas, the rural rate of HIV infection is lower than in urban areas, but the absolute numbers of HIV infected persons are likely similar, and in fact may surpass the number in urban areas (Mann & Tarantola 1996). The differential between levels in HIV infection in urban and rural populations is narrowing: findings from the rural Rakai cohort (Wawer et al. 2005) suggested that deaths and out-migrations of HIV-infected people contributed significantly to a lowered HIV prevalence. It is also advisable to bear in mind that Uganda's HIV epidemic has followed the typical evolution that has been seen throughout sub-Saharan Africa: initially, urban populations were the most affected, but through a combination of factors including population displacement, armed conflicts, proximity to highways and population mobility for economic and other reasons, rural communities located along highways became rapidly affected, and then more remote rural areas followed suit (Mann & Tarantola 1996). Furthermore, evidence of sexual networking in both urban and rural areas has been documented (Obbo 1993). Despite this cautionary evidence, the decline in HIV prevalence and risk in semi-urban and rural areas of Kabarole District can be interpreted as a sign that HIV intervention activities have been successful.

Education[10]

The lower HIV risk in semi-urban and rural areas could be partially explained by lower educational (and by extension, socioeconomic) status in these areas, which results in decreased wealth and mobility and fewer opportunities for sexual networking. By contrast, women in urban areas tend to be better educated, wealthier and more mobile, which can increase their risk of getting infected with HIV. Hargreaves & Glynn (2002) postulate that marriage predominantly occurs between men and women of similar socio-economic circumstances, and that among men, higher socio-economic status is associated with increased opportunity to use commercial sex workers. Therefore, more highly educated women in any site may be at higher risk of HIV infection through their husband's behaviour.

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[10] It should be noted when interpreting results from ANC data that pregnancy may preclude higher education, therefore those with higher education may not be seen in ANCs. On the other hand, ANC attendance may be influenced by education level; this influence may differ between sites (Zaba & Gregson 1998).

However, the effect of educational level on HIV status in Africa is complex and changing. In several studies conducted during the 1990s in Uganda, a protective effect on HIV infection was seen with lower levels of education, and among those with secondary schooling or higher, HIV risk was increased in both rural and urban communities (Kirunga & Ntozi 1997, Kilian et al. 1999, Smith et al. 1999). This effect could be changing with time: Kilian et al found that, in the Fort Portal ANC population, higher education significantly increased HIV risk in 1991-1994, but in later periods (1995-1997), risk was lower among women with higher education. This trend was particularly pronounced in the younger age groups (under 25 years). Similar findings were reported in rural Masaka District (de Walque et al. 2005), comparing 1989-1990 with 1999-2000.

The bivariate analyses performed in this study confirm this, as the most dramatic declines in unadjusted HIV prevalence occurred among those with secondary education or higher, and these declines were most apparent after approximately 1994, especially in the semi-urban site. This was substantiated in the multivariate model for the overall sample, which showed an increasing HIV risk with increasing education up to the primary school level, then a decreasing risk for those with secondary education or above.

Although the stratified multivariate models did not show a statistically significant association between education and HIV risk in most cases, they mirror the findings of Kilian et al. Over the period 1990-1994 in the urban and rural sites, the peak in HIV risk occurred in the secondary/tertiary level of education. In contrast, during the period 1995-2004, there was a lower HIV risk in the secondary/tertiary education levels compared to primary school in the urban and early semi-urban sites. In the late rural site (1995-2004), there was no clear pattern between HIV risk and education level. However, women with the highest level of education normally attained in rural areas, primary school, showed a substantially reduced HIV risk in this site compared with illiterate women and literate women who had not attended school. Distribution of educational attainment did not vary greatly over time in any site except the late semi-urban (1995-2004), where numbers of illiterates increased and numbers with primary education decreased. This could explain why the peak in HIV risk occurred in women who had less than a primary school education in the late semi-urban site.

The age-stratified multivariate model shows an increasing HIV risk up to the primary education level in all age groups except 30-34 years; however, this risk declined sharply once secondary or tertiary education was attained in women under 25 years, and especially in those aged 15-19. On the other hand, risk continued to increase or remained stagnant with higher education in women over 25 years of age. The variations in age-specific HIV risk according to education level could imply that women of younger ages have reacted more positively to HIV-related information, and that there is a strong association between education in schools and young women's access to and processing of HIV information.

Based on these findings, it can reasonably be suggested that in rural, semi-urban and urban Kabarole District, behaviour changes resulting from HIV/AIDS education in schools are beginning to counterbalance the risky lifestyle that can accompany higher education. This is especially apparent in the younger age groups, which have been more intensively exposed to HIV education, particularly in urban and semi-urban areas. These young groups have benefited more than their older counterparts from HIV education – including increased decision-making capacity and access to HIV-related information – and thus are more likely to have changed their sexual behaviours.

Age group

The age-specific trends in crude HIV prevalence and HIV risk over time indicate that the most pronounced declines have occurred in the younger age groups, while increases have occurred in women over 25 years of age. The 15-19 year age group is of particular interest, as prevalence trends in this group are thought to be most indicative of HIV incidence trends (see literature review). Therefore, the decrease in HIV prevalence and HIV risk over time in young women in Kabarole District as seen in bivariate and multivariate analyses is most likely an expression of reductions of HIV incidence, given a long incubation period and little AIDS-related mortality in this group (Kilian et al. 1999). Women in this age group will have started their sexual life after the beginning of HIV/AIDS information campaigns in Kabarole District in 1990, including intensive health education in schools (Kilian 2000); therefore this is an age group which is most likely to adopt new patterns of sexual behaviour, and as a consequence, to experience lower incidence of HIV infection. Behaviour changes reported to have occurred in Uganda in this young age group during the 1990s include delay in sexual debut (both sexes), increased age at marriage among women, a sharp increase in condom use, and decreased teenage pregnancies (Asiimwe-Okiror 1997, Kilian et al. 1999, Kamali et al. 2000).

In contrast, most older individuals (30 years and above) will have started their sexual lives before the advent of AIDS prevention campaigns in Kabarole District, assuming that age at first sex is 16-18 years (Kamali et al. 2000). Most older women are no longer in school, and thus are not as intensively targeted by HIV/AIDS interventions as their younger counterparts, and even if they had been exposed to information on how to prevent HIV later in life, they may already have developed sexual behaviours that put them at risk of HIV infection. Women in this age group have also had a longer exposure to HIV through sexual activity. Furthermore, HIV-related decreases in fertility which are most common in older women would prevent these women from attending ANCs, therefore it can be assumed that HIV prevalences and HIV risks reported here are underestimates for this age group. Another factor explaining the increasing HIV risk over time for women 25 years and above is the cohort effect of HIV infected women aged 20-24 years moving into the 25-24 year and older age groups. For this reason, the increasing HIV prevalence among older women in the ANC population does not necessarily mean that there is an increase in incidence in this age group. In fact, some older women may have adopted more careful sexual behaviours, even if they are already HIV positive. Increasing HIV prevalence in the older age groups can be expected to become even more pronounced in the coming years as ARV treatment becomes more widely available, and those infected with HIV are living longer, underlining the importance of HIV prevention activities targeted toward HIV-positive people.

In the age-stratified multivariate analysis, HIV risk was seen to peak in the 25-29 year age group in the urban site, while it peaked in the 30-34 year group in the late semi-urban and late rural sites. These patterns could indicate that in rural areas, older women are more severely affected by HIV infection; this could be due to delayed awareness of HIV as a consequence of delayed or less intense AIDS control activities in these areas, including prevention of transmission among those who are already HIV-positive.

Marital Status

Marriage is traditionally considered a risk factor for HIV, as women in monogamous relationships cannot protect themselves against infection if their spouses are not similarly monogamous (Mann & Tarantola 1996). In Uganda, several research studies and national surveys have provided evidence of this: the 2000-2001 Demographic and Health Survey indicates that many young women marry men who are older and sexually experienced, thus placing them at increased risk of contracting HIV from their husbands, and data from rural Rakai District indicate that most men with multiple partners are married (Wawer et al. 2005). Studies have also reported on the social unacceptability of condom use within marriage (Kengeya-Kayondo 1999).

Therefore, it is surprising that after adjusting for age, education, occupation and site in the multivariate analysis, HIV risk was nearly 20% lower in married women than in single women. In stratified analysis, this was true in urban and rural sites, and the protective effect was especially pronounced in the older age groups (women aged 25 years and older), larger proportions of which were in married relationships. The reasons for the relationship between marital status and HIV infection are not clear, although evidence that HIV infection has worsened marital instability in rural Masaka District (Malamba et al. 1994) could suggest that being divorced (or single) is associated with higher risk of HIV infection. The lower risk of HIV in married women could likewise be cautiously interpreted as meaning that in the ANC population, fidelity in married relationships is widespread. However, the fact that HIV prevalence and risk has declined most in the younger age groups, in which the most single women are concentrated, makes these interpretations difficult to confirm. The fact that in most sites the number of married women was far greater than those who were single could also account for lower HIV prevalences and risks of HIV among the married women. An interesting exception is the late semi-urban site, which had the highest numbers of single ANC attendees, yet showed a slight increase in HIV risk among married women compared to single women.

Occupation

Occupation, like education, can be considered an indicator of socioeconomic status. Not surprisingly, in the ANC population HIV prevalence was highest in those working in the economic sectors of business and trade: in all sites except early and late semi-urban, business owners were found to have the greatest risk of HIV infection when compared to their peasant/farmer counterparts. This is not surprising, as those in business professions are known to be a more affluent and mobile group with many opportunities for sexual networking, and even in rural areas, higher economic status has been associated with higher levels of concurrent partnerships (Ssenzongi et al. 1996). This group would also likely be older. The fact that "other" occupations had the highest risk of HIV in the semi-urban sites could be a result of the small sample size in this category; however, the "other" occupation category includes servants and students, two groups with high potential to engage in sex work and/or sexual networking.

Parity

Age group HIV prevalence trends are echoed by the trends seen in the parity groups among the ANC population. The general trend of peak HIV prevalence in the 1-2 parity group, followed by a decline in prevalence, was true for the urban and semi-urban sites. In the rural area, the prevalence increased up to the 6-9 parity group; this finding is difficult to interpret given that parity is similar in all sites, but is consistent with the finding that older women have higher HIV prevalences in semi-urban and rural areas, further confirming the suggestion that older women are more affected by HIV in these areas. Across sites, prevalence was lowest among women experiencing their first pregnancy as these women would be younger, and are expected to have begun their sexual lives only recently.

Behaviour change

In Uganda, awareness of HIV/AIDS and knowledge of its prevention, a prerequisite for adopting sexual behaviour change, is nearly universal and has been confirmed through repeated national surveys (Kirungi et al. 2006). However, sexual behaviour is the most important means of tracking changes in HIV transmission in the population. Although the univariate and multivariate analyses allowed us to estimate the influence of sociodemographic variables on HIV risk, the ANC database cannot directly provide information on behaviour change, which is hypothesized to be the reason behind the decline in HIV prevalence in the ANC population, especially in young women. Such behaviour changes are difficult to quantify, and the surveys required to collect this information require extensive resources and organization. Therefore, this discussion of behaviour changes will be limited to speculations based on our analyses, as well as previous research and surveys done in Uganda. Whether national-level surveys reflect behaviour changes in Kabarole District is uncertain, and cannot be verified through the ANC database.

In Kabarole District, Kilian et al (1999) presented a method of linking HIV prevalence trends from ANC data to behaviour change using a mathematical model simulating heterosexual transmission of the HIV virus. This model stratified the population according to their age and sexual activity group, ranking each subject using defined criteria for risk. To simulate behaviour change, a reduction in transmission probability per partnership was applied over a time period where the District AIDS Control Programme intensified its activities (these activities included condom promotion, HIV education, and voluntary counselling and testing). In Kilian et al's study, the behaviour change model was remarkably similar to the observed decline in HIV prevalence seen from the ANC data. This provides possible evidence that the declines in HIV prevalence and HIV risk found in the Kabarole District ANC population reflect behaviour changes such as increases in condom use, reduction in number of sexual partners, and, especially among young people, sexual abstinence and an increased age at first sex. Additionally, this model provides evidence of a link between AIDS Control Programs in Kabarole District and behaviour change.

Some behaviour changes among young women, such as those outlined in the discussion of age-specific HIV risk (above), have been confirmed through various national surveys. According to the 2004-2005 Uganda HIV/AIDS sero-survey, there is a delayed age at first sex among youth of both sexes aged 15-19 years, as the number who report never having had sex has steadily increased from 38 % in 1995 to 54 % in 2005. The highest condom usage (55.6%) among women engaging in high-risk sex is in the 15-19 year age group. Uganda DHS reports from 1989, 1995 and 2000 show an increasing age at first sex among women from 16.5 years in 1989 to 17.3 years in 2000, and a similar increase among men (Kirungi et al. 2006). Based on these reports, abstinence (in both youth and adults), reduction in premarital sex and condom use during risky sex appear to have occurred. However, a general increase in ANC attendance by 15-19 year old women in our sample, and in particular single women of this age, especially after 2001, could be a sign that unprotected premarital sex and teenage pregnancies continue to occur.

There is still a need for vigilance, even as HIV prevalence rates decline in Uganda. Despite some positive changes, the 2005 HIV/AIDS sero-behavioural survey shows a worrying stagnation in sexual behaviour change, especially among men: 29% of men report having multiple partnerships versus 4% of women, and the 2000 DHS reports that men are 4 times more likely to have premarital sex than women, with rates of male extramarital sex remaining relatively stable since 1995 (Kirungi et al. 2006). These are worrying findings, given that partner reduction and a decrease in concurrent partnerships are seen as crucial elements in HIV prevention (Shelton 2004, Hankins 1998). Furthermore, the male-female imbalance in sexual behaviour will continue to pose major challenges to sexual behaviour change. Condom use is inconsistent in both sexes, as only about 50% of women and men participating in the 2005 sero-behavioural survey reported using a condom the last time they had sex with a casual partner. Rural-urban disparities were also apparent from the DHS surveys – rural women's use and awareness of condoms was roughly half that of urban women's, although improvements were noted between 1995 and 2000 (Kirungi et al. 2006).

Recent findings on the determinants of declining HIV prevalence in the Rakai cohort (Wawer et al. 2005) provide other evidence of setbacks in sexual behaviour change, which, if Rakai is not unique within Uganda, could indicate that there are still many challenges remaining with respect to changing sexual behaviours. The authors suggest that in this population, sexual behaviour change is limited to the "C" in the ABC strategy, as increased condom use with casual partners was noted. However, age of sexual debut declined, while non-marital relationships and multiple partnerships increased. The authors postulate that in fact, the declining HIV prevalence in Rakai can be largely explained by HIV-related mortality. Furthermore, with increasing access to ARV drugs, behavioural disinhibition among those undergoing ARV treatment could lead to higher-risk sexual behaviour and could cause a higher HIV incidence in the population. This will be discussed further with regard to the household surveys and the FGDs.

Discussion 2: Public perceptions of HIV trends

This discussion addresses the third research question, concerning the public's awareness of and interpretation of the declining HIV prevalence in Uganda and Kabarole District. Respondents to the household survey and FGDs provided insights not only into their level of awareness of HIV prevalence trends, but also their explanations for the perceived increase or decrease in HIV infections in their locales. Additional issues with regard to HIV spread and prevention were raised, highlighting concerns surrounding intentional spread of HIV and lack of sexual behaviour change among youth.

Awareness of AIDS

The household surveys revealed that Fort Portal residents of all ages, across both genders and different socioeconomic levels have a very high awareness of HIV/AIDS. The elements of Uganda's ABC strategy, and abstinence in particular, figured prominently in survey respondents' knowledge of the modes of transmission and prevention of the disease. This agrees with Allen's (2006) conclusion that national campaigns have been highly successful in increasing awareness of the disease, if not directly causing behaviour change. The high intensity of AIDS control programmes in Kabarole District was reflected in the household survey, which showed that programmes such as VCT and HIV education programs seemed to have reached the widest audience. The responses of the Fort Portal residents surveyed agree with the findings of the most recent HIV/AIDS sero-behavioural survey.

Sources of information on AIDS

Various forms of popular media, particularly radio, have been instrumental in informing the public in Fort Portal about AIDS and AIDS control programmes, and this was reflected in the household survey. Furthermore, there appeared to be a high level of trust in health workers as sources of information on AIDS. This indicates that HIV education and communication is occurring often in medical facilities, and that these services are widely accessed by the public, at least in urban areas. Concerns were raised in both the survey and the FGDs, however, regarding access to information on HIV/AIDS in rural areas. In particular radio and newspaper were seen as having problems due to their inaccessibility to those in remote areas who do not have the means or the education to own a radio or read a newspaper. For these reasons, community-level delivery of information, through village leaders or household visits, was frequently recommended.

Self-reported risk of HIV infection

Not surprisingly, respondents 45 or under were more likely to say they were at risk of HIV infection, as were those with higher education, who would be more likely to have awareness of their own risk behaviours. Just over 50 % of our sample believed themselves to be at risk, similar to the sample studied by Kengeya-Kayondo et al. (1999); this high level of perceived risk likely reflects a high awareness of risky practices and their prevalence in the community, as well as knowledge of the modes of transmission of the HIV virus. Another similarity to the Kengeya-Kayondo study was that significantly higher proportion of married respondents who believed themselves to be at risk compared to those who were single. These authors provide a possible explanation due to the unacceptability of condoms within marriage, in contrast to the relative ease of condom use for singles.

Behaviours related to Uganda's ABC strategy were strongly apparent in the answers of those stating that they were not at risk of HIV infection, with abstinence by far the most prevalent answer. The perception of abstinence as the most risk-lowering behaviour could reflect the current emphasis on abstinence in the Ugandan NACP, but the relatively small number of respondents citing condom use could be an indication that the three approaches of the ABC strategy are not being emphasized equally. This is a worrying sign, as there is evidence suggesting that abstinence strategies do not lower HIV prevalence (Wawer et al. 2005, Human Rights Watch 2005, Das 2005).

Risk of getting HIV was perceived to be lowered if one had already tested for HIV, although little evidence exists that knowing HIV status changes risk behaviour for those who test negative (Wolff 2005, Matovu 2005). Mistrust of one's sexual partner was widespread among females, which is not surprising given the high rates of extramarital sex and multiple partnerships among men, as reported in the 2005 sero-behavioural survey and the Rakai cohort data (Wawer et al. 2005). It could also be a reflection of the subordinate status of Ugandan women in relation to their sexual lives and sexual decision-making capacity (Kengenya-Kayondo et al. 1999).

Overall, the fact that over 50% of the sample believed themselves to be at risk of HIV infection is an encouraging sign indicating a high level of awareness of their own and others' risky sexual behaviours.

Awareness of prevalence trends

The methods used to communicate and disseminate HIV/AIDS information to the public have likely influenced both the perceptions of and the explanations for HIV prevalence trends given by survey respondents. Household survey findings suggest that Uganda's HIV trends have not been effectively communicated to the public, as there was no real consensus on whether HIV had increased or decreased in Uganda since the early 1990s. In fact, a small majority of household survey respondents felt that it had increased. This may be linked to the fact that there are far fewer reliable sources of information on HIV prevalence trends than on general HIV/AIDS information; this in turn could be due to the relatively recent decline in HIV prevalence in Uganda, which has been variable in different regions of the country.

Either way, the lack of "official" methods of communication about HIV prevalence may be a factor in the reliance on witnessed AIDS deaths as a source of information: as long as deaths continue to occur in localities, people continue to perceive HIV as getting worse, not better, even though the numbers of new infections might be decreasing. However, there was a significant association between saying that HIV was decreasing and higher education level, as well as male gender. This points to the fact that those with higher levels of education (who are generally men), are more likely to have accessed accurate information pertaining to prevalence trends. Women's lower mobility, and tendency to spend more time in the neighbourhood interacting with and caring for those sick and dying of AIDS, could be another reason why women were more likely to say that HIV was increasing in Uganda. This is substantiated by the fact that more women than men in the household survey framed their perceptions of HIV trends through having lost friends or relatives to AIDS.

One significant difference between the household survey findings and the FGD findings was that the majority of FGD participants agreed that HIV prevalence was decreasing in Uganda. This could perhaps be explained by the fact that FGD participants were of a higher than average socio-economic status: they had enough leisure time to be able to travel to the FGD site and participate in the discussion, and they belonged mostly to groups related to schooling or employment. In addition, the group effect (Kitzinger 2000) could have minimized dissent among group members and caused participants to agree on the issue whereas individually, more disparity in answers may have been found. An exception to the views on HIV prevalence was the female youth group, which overwhelmingly stated that HIV is increasing in Uganda. This is interesting given the rising education levels among young women and the sexual behaviour changes reported to have occurred among them.

Sources of information on HIV prevalence trends

As mentioned above, different sources of information appear to be used for communicating HIV prevalence trends than for general HIV/AIDS information, as it was found that personal observation of AIDS-related sickness and death replaced the media as the main source of knowledge regarding HIV prevalence trends. This was found in both the survey and the FGDs. Distinctive communication channels in Uganda, based on social networks of friends and families, have been previously shown to be the dominant means of communicating about AIDS (Low-Beer and Stoneburner 2002). According to Low-Beer, Stoneburner and Mukulu (1997), 91.5 % of men and 86.4 % of women knew someone with AIDS through social networks in Uganda by 1995. They postulate that this shows that AIDS issues were rooted in discussions in social networks, rather than passively received from public health and media messages, to which there was widespread scepticism. This scepticism seems to have dissipated somewhat, as there were relatively few negative comments about communication of AIDS-related information from the government and other organizations, and a high level of trust and respect for health care professionals. Despite this, and possibly due to a lack of reliable public health information or deficiencies in communicating this information, in the study population personal observation was the most relied-upon source of information on HIV trends.

Explanations for prevalence trends

Behaviour Change

Increased AIDS-related knowledge and awareness was seen as the biggest contributor to declining HIV prevalence. Respondents felt that knowing how to prevent HIV infection, and being aware of services such as VCT, PMTCT and ARV drug treatment, were catalysts for utilization of programs and services, and ultimately, effective treatment or behaviour change.

Therefore, awareness leading to behaviour change affecting HIV risk and spread appears to be very much in the public consciousness. In both the household survey and the FGDs, behaviour changes were often mentioned as the reason for decreasing HIV prevalence; similarly, lack of behaviour change was noted by household survey respondents as the major reason for increasing HIV prevalence trends. Although the specific behaviour change was not always specified, a recurring theme was the 'ABC's of HIV prevention, namely abstinence, being faithful, and condom use. Condom use was the most often mentioned of the ABC strategies in terms of influencing HIV prevalence trends. This contrasts with earlier discussions of HIV *prevention*, in which frequent mentions of abstinence could be a reflection of the dramatic increase in awareness of abstinence that has occurred in Kabarole District Kilian (2000), and that continues with abstinence-only programming in schools and other organizations (Human Rights Watch 2005). However, the frequent mentions of condoms among the survey and FGD respondents could indicate that the Fort Portal public also considers this an effective mechanism for HIV reduction. Faithfulness was the most infrequently mentioned of the 'ABC' strategies, both in terms of prevention and as a reason for declining prevalence. This could suggest that condom use and delaying sex until marriage (or abstaining for other reasons) are more preferred and feasible means of prevention among the general population. When the topic of behaviour change was probed in the household surveys, there was no consensus on whether sexual behaviour change had occurred in respondents' locales. Women were more likely to state that behaviour change had not occurred, which aligns with their generally more pessimistic view of the HIV epidemic according to the survey. This could be caused in part by women's more intimate acquaintance with the suffering of friends and relatives with AIDS.

PMTCT, VCT and ARVs

Although PMTCT was universally regarded as having reduced HIV, VCT and ARV drugs appeared to be controversial topics, with both household survey and FGD respondents arguing for positive and negative effects of the two on HIV trends. Household survey respondents were unsure of whether VCT was used in the community; this could be indicative of the stigma that can be attached to going for an HIV test (Wolff 2005). Although VCT and ARVs were generally seen as factors reducing HIV prevalence, a significant number of survey and FGD respondents felt that VCT could contribute to rising HIV prevalence. The explanation given for the link between VCT and increasing HIV prevalence was that those testing positive subsequently received ARVs, which eliminated signs and symptoms of the disease, allowing the patient to resume his/her risky behaviour. Interestingly, all but one of the survey respondents who believed that VCT had increased HIV prevalence were women. This could suggest, as stated by Nyblade et al (2001), that women are less likely to use VCT services, possibly due to fear of repercussions from the spouse upon a positive test result.

Intentional spread of HIV

The issue of intentional spread of HIV was explored in more depth in the FGDs, and emerged as a pressing concern. Intentional spread was sometimes linked with ignorance or disregard of AIDS control messages. This was a commonly cited explanation for increasing HIV trends that emerged from both the household surveys and FGDs, and it raises the disturbing issue of apathy and ambivalence towards HIV/AIDS. The "I don't care attitude" reported by some respondents was mainly attributed to youth, who were singled out as not having changed their sexual behaviours. Although peer pressure and apathy towards HIV infection were reported by youth FGD respondents, it is likely that adults' traditionally critical view of youth's behaviour was a factor in the frequent negative comments towards them in both the survey and the FGDs.

Stigma and discrimination

The fact that stigma against those with HIV was felt by Fort Portal residents to be decreasing is an encouraging sign, as stigma is one of the major challenges that must be overcome in preventing and controlling the HIV epidemic. Stigma can lead to secrecy and denial among those who are HIV-positive; this can mean that voluntary counselling and testing is not sought, and can ultimately enable the continued spread of HIV. On a national level, however, there is evidence that stigma and discrimination against people infected with HIV still exists: the 2004-2005 sero-behavioural survey reported that only 19% of women and 28 % of men expressed positive and accepting attitudes towards people with HIV/AIDS. The national-level survey asked more specific questions than the household survey used here, and can thus be considered a better measure of the public's attitudes relating to HIV-infected people.

Potential for behaviour change: what you know vs. who you knew

Although a high awareness of HIV/AIDS is an encouraging sign, translating this knowledge into behaviour change is an ongoing challenge, as knowledge levels have not been conclusively linked to behaviour change of the type thought to have occurred in Uganda (Macintyre et al. 2001). Lowered stigma against those with HIV/AIDS, as evidenced by household survey respondents' statements and their awareness of AIDS control and prevention services such as VCT, could be an optimistic sign that behaviour change can occur. Macintyre et al. (2001) report that an implication of personal experience of AIDS is lowered stigma, and this may help individuals change their behaviour: the household survey results suggest that this could be the case. Furthermore, the high number of respondents in both the FGDs and the surveys who reported having close friends and relatives who died of AIDS implies that they are aware of the consequences of risky sexual behaviours. This, as Macintyre et al. (2001) suggests, may improve their ability to respond to HIV intervention programs. There is, however, a possible downside to the lived experience of AIDS, and this was especially apparent in the FGDs: an increase in fatalism, and a belief that one cannot prevent HIV infection. This apathy appeared especially acute among the youth, and young women in particular, who were portrayed in as having limited control over their sexual lives. Even more worrying were the implications by FGD respondents that young girls are subject to strict moral codes governing their sexual behaviour, which place the burden of blame for teenage pregnancies and risky behaviours on their shoulders instead of advocating an equal responsibility for HIV prevention for boys and girls.

On a more optimistic note, some respondents commented on behaviour changes occurring in youth; abstinence and condom use were most frequently cited. However, economic needs and peer pressure continue to lead young girls in particular to have sex with Sugar Daddies.

Sources of information on the Ugandan 'success story' and interpretations of "success"

A majority of respondents in both the FGDs and the surveys were aware of the Ugandan 'success story'. According to respondents, "official" means of information such as the media, government workers and health workers were dominant sources of knowledge of Uganda's 'success story', with much less emphasis on community-based sources such as local leaders, friends, relatives, churches and mosques. This is an interesting finding because it contrasts with information sources on HIV prevalence trends, a topic on which there was far less consensus, yet more reliance on grassroots sources of information. This suggests that information on HIV programme outcomes can be effectively delivered through the mass media, and that government workers can be considered reliable and trustworthy sources of information.

Although there was widespread awareness of the Ugandan ‘success story’, and most respondents agreed that Uganda had been successful, their definitions of “success” varied widely and most did not include lowered HIV prevalence. Interpretations of Uganda’s success tended to revolve around aspects of AIDS prevention activities such as governmental mobilization, the multisectoral response, the provision of free ARVs and sensitization, rather than the fact that Uganda had been successful in reducing HIV prevalence (although a few respondents mentioned this). Interestingly, Uganda was considered “a success” even among those who had stated that HIV was increasing in Uganda. This could be due to a variety of factors, including confusion or misunderstanding of the questions being asked them, or linguistic difficulties in communicating the concept of HIV prevalence in Rutooro. However, these responses also likely indicate that the public has not been adequately informed of the nature of Uganda’s “success”, or that they view preventive activities as being as ‘successful’ as a decrease in the actual disease.

Once again, people’s perception of the Ugandan ‘success story’ appeared to be greatly influenced by the number of sick and dying people seen around them and was a strong predictor of whether or not respondents agreed with the success. As was the case for HIV prevalence trends, this informal means of information, in the absence of more reliable information, can be misleading.

Public support for and awareness of AIDS programs appeared very strong. Respondents to the household survey unanimously supported the continuation and strengthening of AIDS control programs and understood their importance, even in a context of decreasing HIV infection. The frequent mentions of Uganda’s ‘ABC’ strategy further underscore the high level of acceptance that these three behaviour changes are effective in reducing HIV.

Communicating Uganda’s success to the public

However, the complex nature of the HIV prevalence poses a challenge, especially when informing people of different educational and social backgrounds who could interpret the information in different ways. This leads to the question of appropriate risk communication to the public, an issue that, according to the literature and based on comments by health professionals in the FGDs, is difficult to approach. The difficulty lies in the fact that, in delivering the good news that Uganda has succeeded in reducing its HIV prevalence, it is important to strike a balance between motivation for continued AIDS control through sharing the successes of past efforts, and causing risk compensation – increases in risky behaviour sparked by decreases in perceived risk – (Cassell et al. 2006) by falsely reassuring the public that the danger is over. A skewed balance towards the latter could have the disastrous consequences of people returning to their previous, risky sexual behaviours, in the belief that they are no longer at risk of contracting HIV infection; this issue is already being seen with the advent of ARV drugs (Okware et al. 2005). From the FGDs, it seems as if government and health workers are erring on the side of caution, stressing that HIV is still a big problem and not specifically communicating the declining HIV prevalence to the public. The issue of risk communication will not be discussed in detail here, but could be considered a topic for further research in this area.

Satisfaction with HIV-related information from the government, and recommended methods of communication

Responses to questions concerning methods for communicating information on HIV trends yielded similar themes in both the household surveys and the FGDs. Diverse of information were known and accessed by respondents; this is reflective of Uganda's successful approach in using multiple communication channels to educate and inform the public about HIV/AIDS (Cassell et al. 2006). However, satisfaction with information received was often described as satisfaction with the information sources themselves rather than the content of the information. One major source of information was the media, especially radio and newspapers, and this was highly praised for its availability in many languages and ability to reach those in both urban and rural areas. Only a small, highly educated minority obtained their information from medical reports, journals or other official sources. More interactive forms of communication such as community meetings, church gatherings, contacts with health workers, and seminars were also valued means of communication. However, both personal observation and the media (especially radio and newspaper) were portrayed as being potentially misleading because the former can be highly localized, and the latter can be inaccessible to poor, illiterate or very rural populations, and can be controlled or influenced by politics or business interests.

Therefore, many of the recommendations for communication to the public regarding HIV trends and program outcomes involved addressing these shortcomings. Specifically, grassroots-level communication methods such as community meetings and information given through local leaders or household visits were the most frequent recommendations; better information-sharing between public health officials was also seen as a means of improving communication about HIV programme outcomes.

Chapter 6: Final conclusions and recommendations

Study Limitations

Before presenting the final conclusions and recommendations resulting from this study, it is important to outline some limitations of the study and its methodology in addition to those that have been addressed in the methods and discussion sections.

ANC Database

The removal of the 2001-2002 Fort Portal HIV data decreased the quality of the data from that site. This was deemed to be justified, however, due to the unrealistically high HIV prevalence rates seen in these years, which would have reduced the meaningfulness of HIV prevalence and risk trends over time.

As the questionnaire used in obtaining data for entry into the ANC database could not be obtained, the researcher did not have access to details such as which occupations, apart from students and servants, could fit into the 'other' category. Specific information pertaining to education, such as whether a stated education level meant that the level was in progress or had been obtained, was also unavailable to the researcher. Furthermore, sociodemographic information was collected by health workers and not researchers trained in the proper collection of such data; due to this, ambiguities or inconsistencies could have been introduced into the database.

Among the ANC attenders, there is a risk of age mis-estimation where date of birth is uncertain, and heaping on age 20 has been known to occur, especially if there is a social concern or stigma about early or premarital pregnancies (Zaba 2000). In our data set, where age groups are broken into 15-19 and 20-24 years, this could have an effect on prevalence estimates.

As HIV testing was unlinked and anonymous, it is probable, although impossible to verify, that the database included repeat HIV test data for the same person, which can lead to exaggerated estimates of HIV prevalence if there are many repeated measures in the database. These people represent repeat ANC attenders who would have been tested two or more times in subsequent pregnancies. The problem of repeated measures is likely to be most pronounced in the rural areas, which are fairly remote and where ANC attenders have fewer options for antenatal care.

The semi-urban site Kyegegwa was located on a poorly repaired road during the surveillance period 1991-1994; this decreased ANC usage at this site to an extent that Kyegegwa could almost be considered a busy rural site. Therefore its classification as a semi-rural site is not entirely accurate. Furthermore, since rural sites have been shown to have lower HIV prevalence rates and a lower risk of HIV infection, it is difficult to explain why crude HIV prevalence and risk of HIV in the semi-urban sites increased over the period 1991-1994, when Kyegegwa was included in serosurveillance, but decreased once it was removed in 1995.

Finally, the odds ratios reported here represent cross-sectional measures of HIV risk which are valid for only one category of a given variable, at one given point in time. Trends in HIV prevalence over time are unadjusted for the covariates in the database. In order to obtain an estimate of odds of HIV risk over time, a longitudinal study would need to be conducted.

Household Surveys and Focus Group Discussions

The first and most obvious limitation is the language barrier. In translating the consent forms, survey questions and FGD questions into Rutooro, where equivalent words and meanings for English terms often do not exist, it is certain that some meaning was lost. Translations were done in such a way as to minimize respondent confusion and to prompt a clear answer; however, in this process some questions were greatly simplified and conveying the exact meaning of the question to respondents was difficult. An example is the interpretation of the word 'risk' as 'chance' in Rutooro, which could have affected levels of perceived risk found in the household survey population.

The analysis of household survey data was also constrained by the need to interview only subjects aged 18 years and older, for ethical reasons. This excludes the 15-17 year age group which could have valuable insights into HIV prevalence trends and youth behaviour change in relation to those trends.

In using the focus group discussion as a research methodology, there can be a group effect where certain individuals will comment more frequently and assertively than others. This is a difficult challenge for the moderator, who must balance the need for participants to express themselves freely with the need to receive input from everyone in the group. Additionally, the group dynamic may result in some individuals silencing their comments or stating that they have knowledge of a topic when in fact they do not, in order to conform to the group (Kitzinger 1995). Indeed, most FGDs had individuals who did not contribute very much to the discussion, even after prompting by the researcher and the moderator. Some of the focus groups were composed of colleagues, friends and neighbours, for whom this group effect could be significant. Focus group participants were a convenience sample, chosen by the BHS Team Leader and the Research Assistant who moderated most of the FGDs. Therefore, it is impossible to determine whether the FGD participants represented a realistic cross-section of the Ugandan public. Attempts were made to mitigate this problem by choosing focus groups from a wide range of ages and backgrounds in society.

In the FGDs and household surveys, the data obtained represents, by definition, reported rather than observed attitudes, behaviours and practices. Furthermore, some of the data collected dealt with sensitive issues such as risk behaviours and practices. These problems were likely minimized by the use of well-trained and experienced local research assistants, although the presence of a 'muzungu' or foreigner at some of these interviews and discussions could have exacerbated them. Therefore it is possible that some of the collected data reflects intended or desired answers rather than actual facts. However, the consistency between the household surveys and FGDs enhances confidence in the trustworthiness of collected information, even if there is no solid proof of its validity.

Conclusions and recommendations

The results and discussion presented here substantiate the decreasing HIV prevalence trends in Uganda, and they further show that this decrease is occurring in rural and semi-urban areas in addition to urban centres. This good news should serve as an encouragement and motivation for AIDS control programmes to pursue and reinforce their prevention activities, as the decreasing HIV prevalence and risk of HIV seen in young pregnant women over time is a good indication that HIV incidence is declining.

Previous evidence from national-level behavioural surveys and mathematical modelling suggests that, in Uganda, this decline is due to sexual behavioural changes, mainly condom use and abstinence. The findings from the household survey and FGDs used in this study confirm this, as changes relating to the ABC strategy were almost universally cited as causing HIV to decline. This provides evidence that AIDS Control Programs have been effective, and therefore it seems appropriate to recommend that AIDS Control Programs continue to reinforce the ABC strategy, particularly in the younger age groups (less than 25 years), because these groups have been shown to take up the information very well.

Based on multivariate analysis, women in age groups older than 25 years and those with lower levels of education have shown a smaller decline in HIV prevalence and risk. The fact that higher education is associated with lower HIV prevalence for young women suggests the importance of the role of the educational sector in fighting AIDS. Therefore the results of this study support continued emphasis on HIV education in schools; however, further efforts are also needed to target HIV prevention at the less educated, as suggested by Hargreaves & Glynn (2002). More resources should be focused on reaching out-of-school youth and adults with prevention messages.

In older women, the cohort effect accounts for some of the increase in HIV risk and prevalence over time. Older women's increased involvement in the trading sector and their lack of exposure to HIV prevention messages are also factors in the increase. Based on the results of the FGDs and the household surveys, spread of the virus by those who are already HIV-positive is a growing concern which could be reflected in the increasing number of HIV-positive older women in the ANC database over time. This group should not be overlooked and should be targeted for preventive measures and support, especially with the advent of ARVs which will increase transmission time: as outlined by Wawer et al. (2005), prevention of HIV transmission by those who are on ARVs needs to be a focus in the coming years. Furthermore, increased supports for the HIV-positive could bring much-needed attention to a group that tends to be overlooked in HIV prevention programmes and is in greater danger of losing hope and abandoning the "living positive" mentality. A more open discourse on HIV and ARV drugs would be a logical first step in supporting positives.

The public is highly aware and supportive of AIDS prevention programs. This suggests that the public would be receptive to information on the success of Uganda's AIDS control programmes, and their extensive personal experience with HIV/AIDS could mitigate their return to previous risky sexual behaviours. However, the challenges posed by risk compensation are very real in the Ugandan context, where there is increasing access to ARVs, and a potentially widespread awareness that HIV is decreasing in Uganda. There is no easy way to manage risk compensation, but some strategies have been offered by researchers such as Cassell et al. (2006) who stress the importance of communicating to the public that while innovations such as ARVs and VCT are important elements of HIV prevention, they alone will not eliminate the risk of HIV infection. Their limitations must be clearly identified and behaviour change should be vigorously promoted as the foremost way to prevent HIV infection despite these successes.

In addition to reinforcing the ABCs of behaviour change, Uganda should continue to give clear, consistent messages to the public regarding HIV prevention. This is especially important with regard to youth, as it is particularly in this group that apathy is occurring, perhaps due to the fact that they are beginning their sexual lives at a time when HIV prevalence is declining in Uganda and they have less experience of the effects of AIDS compared with their older counterparts. Therefore special attention needs to be paid to delivering prevention messages to youth and equalizing responsibility for sexual behaviour among girls and boys. The current abstinence-only emphasis of HIV prevention activities in Uganda poses a potential concern in this regard. Although purportedly aiming to reduce confusion among adolescents with regard to HIV prevention strategies, the abstinence-only approach may in fact diminish their capacity to reduce their HIV risk, as it de-emphasizes condom use. This could be an especially difficult issue for girls and young women who have less sexual decision-making powers than men and are often involved in higher risk sexual activities.

Many authors have stressed the importance of partner reduction in reducing HIV prevalence and incidence (Stoneburner & Low-Beer 2004, Halperin et al. 2004, Shelton et al. 2006). Therefore, the infrequent mention by study respondents of faithfulness as a behaviour change, as well as recent data from the Rakai cohort (Wawer et al. 2005) and national surveys indicating stagnating or increasing rates of partner change, are worrying. This data could reflect some or all of the factors discussed above, such as apathy, risk compensation, or inconsistencies in emphasizing all elements of the ABC strategy. These findings provide an even stronger argument for recommending the continuation of a balanced ABC focus in schools and in the community.

The FGDs engaged some complex contextual and societal issues influencing the spread of HIV within populations. Although the issue of stigma appears to have been dealt with well in Uganda, it is clear that gender inequality, sexual coercion, cross-generational relationships and commercial sex remain challenges that must be addressed by prevention programmes, as stated by Halperin et al. (2004). Targeting interventions to the male population would be a logical step in equalizing the balance of risk between the sexes. The crucial role of parents in educating their children to avoid HIV infection was also underlined in the FGDs, leading to the recommendation that parents be supported in communicating healthy values and expectations about sexual behaviour to their children.

The public's perception of their risk of HIV infection provides some important insights, as understanding risk perception is essential in designing effective behaviour change interventions. Over half of the adults in the Fort Portal survey see infection with HIV as a real possibility in their lives, even though they have a very good knowledge and awareness of AIDS and the preventive mechanisms. In order for behaviour change to occur, individuals must genuinely believe that they are at risk of HIV infection (Kengeya-Kayondo 1999); this would indicate that the Fort Portal population has responded well to behaviour change strategies. Therefore, instead of focusing more resources on raising awareness (it is already high), sustainable control measures, such as condom availability, promotion of mutual faithfulness and better treatment of STDs and AIDS-related illnesses, must be made available.

The fact that the Fort Portal community uses socially-based communication channels such as personal observation of AIDS deaths to inform knowledge of HIV trends in their localities is an important observation of this study. Existing HIV education programs in the community should take this fact into account by strongly promoting an open dialogue on the disease and encouraging disclosure. One potential vehicle for this, based on respondents' recommendations, is at burials, where cause of death could be openly discussed among a large gathering of people. There are, however, potential ethical considerations in this situation, including the need to protect the privacy of the family. Another recommendation for improving communication about HIV prevalence trends is getting the message out to low-income and rural people via community-level outreaches such as household visits and local meetings. "Official" information sources such as health and government workers, which appear to have the trust and respect of the public, could adopt a more outreach-centred, community-based approach as well.

Finally, the potential replacement of ANC data with data derived from VCT and PMTCT HIV testing could compromise the validity of future HIV serosurveillance in Kabarole District, as published evidence suggests that the two methods should complement, not replace, ANC surveillance. Therefore it is recommended that ANC surveillance be retained in some form rather than being completely replaced by VCT and PMTCT surveillance. In order to provide additional insights about the factors influencing HIV risk, surveillance information should be linked to periodic behavioural surveys or alternatively, mathematical models incorporating changes in sexual behaviour, similar to the one presented by Kilian (1999). National commitments should be made to generate, analyze and disseminate information on HIV trends, and international guidance should be provided to enhance a standardized approach to data collection.

The results presented in this study serve as a contribution to an ever-mounting body of evidence that Uganda, through its multisectoral response to HIV and the ABC strategy for AIDS control, is seeing real success in lowering its HIV prevalence rates. Although further understanding of the specific behaviour changes associated with the reduction in HIV/AIDS is needed, the extensive amount of research pointing to a reduction of HIV prevalence and incidence through sexual behaviour change is a beacon of hope. This signifies that the Ugandan experience is poised to become a model of HIV prevention for the global community, as we struggle as a whole to battle our collective AIDS pandemic.

Future research topics

The many concerns raised in the FGDs regarding intentional spread by those on ARV drugs substantiate speculations by Wawer et al. (2005) that "ART availability may result in behavioural disinhibition, increased risk behaviour, and higher HIV incidence." Wawer further states that: "Prevention of ART-related behavioural disinhibition is crucial to contain the future course of the epidemic." With this in mind, Okware (2005) calls for a re-invigoration of the ABC strategy to counteract the complacency that can accompany ARV treatment, which can lead to AIDS being viewed as just another treatable chronic illness. Thus, supports for HIV-positive people will likely emerge as a crucial strategy in containing the spread of HIV, and research into ways of implementing and monitoring prevention programmes for positives would be a worthwhile topic for future research in this area.

Increases in the quantity and quality of data sources with regard to HIV infection have been universally called for by researchers in this area. Therefore, research that aims to expand and improve access to socio-demographic data on sentinel populations would be useful in order to compare them to general populations and to contribute to a clearer interpretation of changing trends in behaviour and infection (Asiimwe-Okiror 1997). For example, information on migration (perhaps by determining duration of residence as a proxy) could help to account for the effect of migration on HIV prevalence. Taking inspiration from Wawer et al. (2005), the effect of HIV mortality in the three geographic strata of Kabarole District should be assessed, as it could impact HIV prevalence levels. In addition, the syphilis test result data in the database have not been analyzed here, but information on STI prevalence could serve as a surrogate for HIV prevalence, and therefore could be incorporated into future analyses of this and similar data.

ANC surveillance is being replaced by VCT and PMTCT surveillance in Kabarole District. Although other studies have examined the relative merits of VCT/PMTCT and ANC data, an analysis specific to Kabarole District could be useful in providing insight into the effectiveness of these different methods in tracking changes in HIV prevalence in the general population.

The nature of the behavioural changes associated with the lowered HIV prevalence is still poorly understood. However, behavioural and KAP surveys undertaken in conjunction with HIV serosurveillance can provide useful explanatory data. Therefore future avenues of research could include development of behavioural surveys. Furthermore, behaviours that have not been examined in DHS or sero-behavioural surveys, such as intergenerational sex, widow inheritance and other culturally-related behaviours would be worthwhile investigating, although collecting this data may be difficult. Sexual behaviours of HIV-positive people and ARV patients would be another useful avenue for research, with ARV treatment becoming more and more widespread, and the increasing concern over intentional spread of HIV.

The topic of risk communication to the public, although not extensively engaged in this thesis, is fascinating and merits closer scrutiny, especially since informal, community-based forms of communication are so prevalent in Kabarole District. Possible research topics could include determining the best means of communicating HIV/AIDS program outcomes to the public while mitigating the effects of risk compensation.

Dissemination activities

Following data collection related to my thesis topic, I undertook several dissemination activities in order to share my preliminary results. In December 2005, while still in Fort Portal, I presented my preliminary findings at Basic Health Services, and invited BHS employees, research assistants and relevant health professionals to this presentation. I also presented my preliminary findings at the Institute of Public Health at Makerere University in Kampala. Those present included the director of the Institute, masters and doctoral students, and other members of the faculty of the IPH. This presentation also took place in December 2005. Following my return to Edmonton, I presented my research during the Student Seminars in the Department of Public Health Sciences, University of Alberta, in February 2006. My findings were displayed in a poster format during the Public Health Sciences Annual Research Day in April 2006. My final results were presented at Global Health Grand Rounds at the University of Alberta Hospital in July 2006.

Upcoming dissemination activities include a presentation for the University of Alberta International, which provided me with financial assistance for my research. This study has also been selected for a poster presentation at the XVI International AIDS Conference in Toronto in August 2006.

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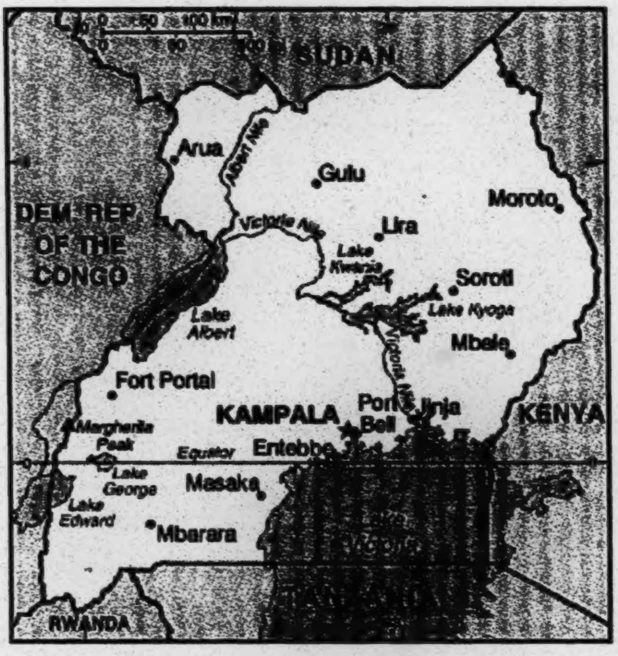
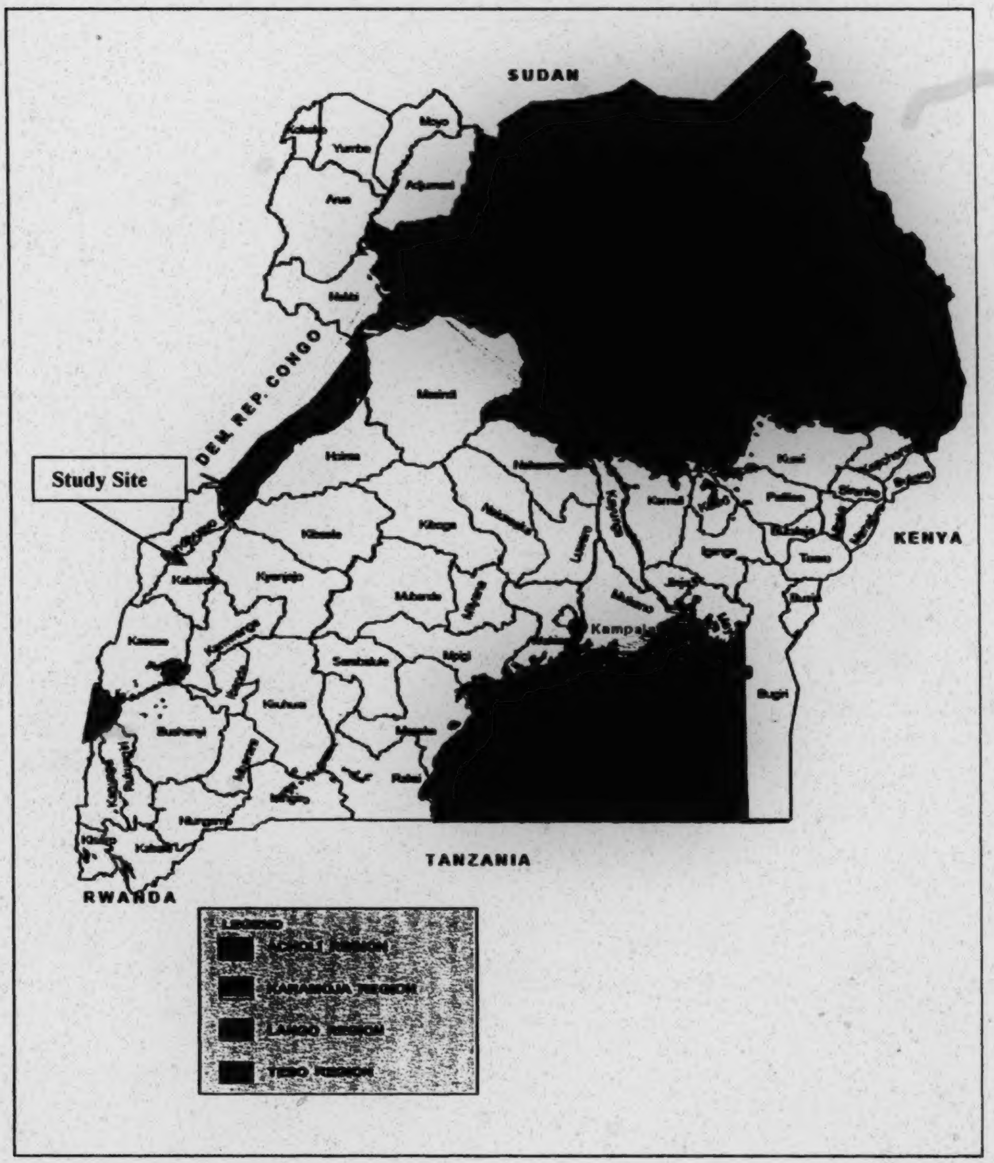
Appendices

Appendix A: Map of Uganda


0 50 100 km
0 50 100 mi
SUDAN
Arua
Albert Nile
Gulu
Moroto
DEM. REP. OF THE CONGO
Victoria Nile
Lira
Lake Kwania
Soroti
Lake Kyoga
Lake Albert
Mbale
Victoria Nile
Fort Portal
KAMPALA
Port Bell
Jinja
KENYA
Margherita Peak
Equator
Entebbe
Lake George
Masaka
Lake Edward
Mbarara
Lake Victoria
TANZANIA
RWANDA

Source: CIA, 2006

Appendix B: Administrative Districts of Uganda


SUDAN
Yumbe
Moyo
Adjumani
Arua
Nebbi
DEM. REP. CONGO
Masindi
Hoima
Study Site
Kibaale
Kiboga
Kyenjojo
Kabarole
Mubende
Kasese
Sembabule
Mpigi
Kiruhura
Bushenyi
Masaka
Rakai
Ntungamo
Kabale
Kisoro
Kumi
Pallisa
Kamuli
Iganga
Tororo
Busia
Bugiri
Kampala
KENYA
TANZANIA
RWANDA
LEGEND
ACHOLI REGION
KARAMOJA REGION
LANGO REGION
TESO REGION

Source: www.reliefweb.int, 2006

Appendix C: Cross-sectional Household Survey Questionnaire

CROSS-SECTIONAL SURVEY

About Awareness of HIV Prevalence Trends

Fort Portal, Kabarole District, Uganda

RESPONDANT I.D. NUMBER ______________________

DIVISION (SUB-COUNTY) ______________________

PARISH ______________________

VILLAGE/ZONE/LC1 ______________________

INTERVIEWER NAME ______________________

COMPLETION TIME **START TIME** _____ **END TIME** _____

DATE ______________________

COMPLETED ON VISIT: **1st** _____ **2nd** _____

SURVEY CHECKED BY: ______________________
CO-INVESTIGATOR

DATA ENTRANT 1: ______________________ **DATE**: ______________

DATA ENTRANT 2: ______________________ **DATE:** ______________

Part A: Demographics

No.	Questions and filters	Coding Categories	Comments
1	What type of house does the respondent live in? **(Researcher's observation)**	Permanent (concrete)...........................1 Semi-permanent (mud/wattle, iron roof)....2 Temporary (grass thatched, grass or mud walls)..3	
2	Respondent	Head of household ....1 Spouse ....2 Son/daughter...3 Relative (sibling, aunt/uncle, cousin etc.)....4	

No.	Questions and filters	Coding Categories	Comments
		Employee..5 Friend..6 Neighbour.......................................7 Other (specify)....................................8	
3	Sex of the respondent	Male ....1 Female 2	
4	How old are you? OR When were you born?	______________ .... / .... / .... DD / MM / YYYY	
5	What is your religious affiliation?	Catholic .... 1 Protestant .... 2 Seventh Day Adventist............................3 Muslim .... 4 Pentecostal...5 Cults...6 Other (specify) 7	
6	What is your occupation?	Peasant...1 Farmer ....2 Self-employed ....3 Businessman/woman (trading) ....4 Student ....5 Housewife ....6 Professional (teacher/civil servant/doctor)..7 Unemployed ....8 Retired..9 Other (specify).......................................10	
7	Do you own any of the following? **(check all that apply)**	Car ....1 Radio ....2 Television ....3 Land ....4 Bicycle ....5 Animals ....6 Refrigerator ....7 Motorcycle 8	
8	What is your monthly income?	Seasonal income.....................................1 Less than 100 000 Ugsh..........................2 100 000 – 200 000 Ugsh..........................3 200 000 – 300 000 Ugsh..........................4 more than 300 000 Ugsh..........................5	

No.	Questions and filters	Coding Categories	Comments
9	What is your marital status?	Single ....1 Married ....2 Divorced ....3 Widowed............4	
10	Have you ever attended school?	Yes ....1 No 2	If no, go to Q 12
11	I f yes, what is the highest level of education completed?	Lower primary ....1 Upper primary ....2 O-levels ....3 Technical ....4 A-levels ....5 Tertiary Institutions ....6 Other (specify) 7	

Part B: Basic Knowledge on HIV/AIDS

No.	Questions and filters	Coding Categories	Comments
12	Have you ever heard of an illness called AIDS (Silimu)?	Yes .... 1 No 2	**After clarifying what AIDS is if response is still "no", discontinue the interview.**
13	Where did you hear about AIDS / Silimu? **(unprompted, circle all that apply)**	Friends / Relatives ....1 Parents ....2 Church/Mosque ....3 Siblings ....4 Community leaders ....5 Radio/TV ....6 News papers / Magazines ....7 Posters / Pamphlets ....8 Health workers (hospital, ANC)............9 Schools / Teachers .... 10 Neighbours............11 Other (specify) 12	
14	What are the main symptoms of AIDS?	Weight loss............1 Diarrhoea ....2 Fever............3 Skin disease (sores, lesions)............4 Weakness............5 Gastrointestinal/abdominal problems...... .6 Herpes simplex............7 Oral thrush/candidiasis............8 TB............9 Loss/gain in appetite............10	

No.	Questions and filters	Coding Categories	Comments
		Vomiting..........11 Other (specify)..........12 Do not know..........88	
15	What are the ways through which HIV may be spread? **(unprompted, circle all that apply)**	Sexual intercourse ....1 Unsterilized instruments (needles, razors, skin or ear piercing) ....2 Using toilet/latrines/bathing with infected people 3 Staying close with infected people ....4 Blood transfusion ....5 Kissing ....6 Sex with prostitutes ....7 Homosexual contacts ....8 Sex with multiple partners ....9 Mother to child transmission ....10 Breast feeding ....11 Witchcraft ....12 Mosquitoes and other biting insects.......13 Drinking too much alcohol..........14 Other (specify)..........15 Do not know..........88	
16	What causes this illness called AIDS / Silimu?	HIV virus..........1 Other (specify)..........2 Do not know..........88	
17	What are the things a person can do to avoid getting HIV? **(unprompted, circle all that apply)**	Abstain from sex..........1 Have only one sexual partner ....2 Use condoms ....3 Sterilised instruments ....4 Choose sexual partners carefully..........5 Nothing can be done..........6 Do not have sex with prostitutes ....7 Do not have sex with homosexuals..........8 Avoid blood transfusion ....9 Seek protection from traditional healer..........10 Avoid kissing ....11 Do not take too much alcohol ....12 Avoid mosquito/other insect bites ....13 PMTCT..........14 VCT..........15 Other (specify)..........16 Do not know 88	
18	Do you consider yourself at risk of getting HIV?	Yes..........1 No..........2 Do not know..........88	
19	Is it possible to cure AIDS?	Yes..........1 No ....2 Do not know 88	**If no/do not know, go to Q 21**

No.	Questions and filters	Coding Categories	Comments
20	If yes, how can it be cured?	Antiretroviral drugs ....1 Traditional medicine ....2 Spiritual healing..3 Other (specify) 4	
21	Are you aware of AIDS control programs in Kabarole District?	Yes..1 No 2	If no, go to Q 24
22	How did you learn about these programs?	Friends / Relatives ....1 Parents ....2 Church/Mosque ....3 Siblings ....4 Community leaders ....5 Radio/TV ....6 News papers / Magazines ....7 Posters / Pamphlets ....8 Health workers (hospital, ANC, clinic)......9 Schools / Teachers ....10 Neighbours..11 Other (specify)..12	
23	How long have these programs been operating?	Less than one year..................................1 One year..2 1-10 years..3 Over 10 years..4 Do not know..88	

Part C: Awareness of HIV prevalence trends

No.	Questions and filters	Coding Categories	Comments
24	What has happened to the total number of people infected with HIV in Uganda since 1990?	Increased..1 Decreased..2 Stayed the same..3 Do not know..88	
25	What has happened to the total number of people infected with HIV in Fort Portal since 1990?	Increased..1 Decreased..2 Stayed the same..3 Do not know..88	If 'do not know', go to Q 29
26	How did you get this information? (How do you know this?)	Friends / Relatives ....1 Parents ....2 Church/Mosque ....3 Siblings ....4 Community leaders ....5 Radio/TV ....6 News papers / Magazines ....7 Posters / Pamphlets ....8 Health workers (hospital, ANC, clinic)......9 Schools / Teachers 10	

No.	Questions and filters	Coding Categories	Comments
		Neighbours..........11 Government workers..........12 Other (specify) .... 13 Do not know..........88	
27	If you answered that HIV has increased or stayed the same, explain why you think that HIV has not decreased.	Lack of sexual behaviour change..........1 Lack of AIDS control programs..........2 Lack of ARVs..........3 Lack of care for AIDS patients..........4 Lack of AIDS awareness/education..........5 Lack of condom use..........6 Other (specify)..........7 Do not know..........88	
28	If you answered that HIV has decreased, what are some important reasons why HIV has decreased?	Increased condom use..........1 Abstinence..........2 Faithfulness..........3 Increased education/awareness of AIDS.....4 Decrease in premarital sex..........5 Those with HIV/AIDS have all died..........6 Traditional healers/spiritual healing..........7 ARVs/drugs..........8 Decreased number of partners..........9 Decreased prostitution..........10 PMTCT..........11 VCT..........12 Economic development..........13 Other (specify)..........14 Do not know..........88	
29	In your village, how has the number of people dying of AIDS changed since 1990?	Increased/more .... 1 Decreased/less .... 2 Stayed the same..........3 Do not know..........88	
30	In your village, how has stigma against people with HIV/AIDS changed since 1990?	More stigma .... 1 Less stigma.......... 2 Stayed the same..........3 Do not know..........88	
31	Have you heard of VCT? **(If they are confused, explain what VCT means)**	Yes.......... 1 No.......... 2	**If no, go to Q 34**
32	Are VCT services being used in your village?	Yes .... 1 No.......... 2 Do not know..........88	**If no/do not know, go to Q 34**
33	If yes, how have VCT services affected the number of people infected with HIV in your village?	Decreased it.......... 1 Increased it .... 2 No effect..........3 Do not know..........88	

No.	Questions and filters	Coding Categories	Comments
34	Do you know about PMTCT? **(if they are confused, explain what PMTCT means)**	Yes......1 No......2	**If no, go to Q 37**
35	Are PMTCT services being used in your village?	Yes ......1 No ......2 Do not know......88	**If no/ do not know, go to Q 37**
36	If yes, how have PMTCT services affected the number of people infected with HIV in your village?	Decreased it......1 Increased it ......2 No effect......3 Do not know......88	
37	In your village, are people changing their sexual behaviour?	Yes......1 No ......2 Do not know......88	**If no, go to Q 40**
38	If yes, what sexual behaviour changes are you seeing in your village?	Increased condom use ......1 Abstinence ......2 Faithfulness ......3 Decrease in premarital sex ......4 Increased education/awareness of HIV/AIDS ......5 Decreased number of partners......6 Decreased prostitution......7 Decreased teenage pregnancies......8 Other (specify)......9 Do not know......88	**If 'do not know', go to Q40**
39	How have these sexual behaviour changes affected the number of people infected with HIV in your village?	Decreased it......1 Increased it......2 No effect......3 Do not know......88	
40	Describe anything else that you think has caused the number of people infected with HIV in your village to decrease/increase.		
41	Have you heard that Uganda is considered a "success story" due to the decreasing HIV/AIDS levels? **(provide explanation if necessary)**	Yes......1 No 2	**If no, go to Q 43**
42	Where have you heard this?	Friends / Relatives ......1 Parents ......2 Church/Mosque ......3 Siblings ......4 Community leaders ......5 Radio/TV ......6 News papers / Magazines ......7 Posters / Pamphlets ......8 Health workers (hospital, ANC, clinic)......9 Schools / Teachers 10	

No.	Questions and filters	Coding Categories	Comments
		Neighbours..11 Government workers............................12 Other (specify) .... 13 Do not know...................................88	
43	Do you agree that Uganda is a "success story"? (Do you agree that Uganda's AIDS control programs have been successful?)	Yes...1 No...2 Do not know.......................................88	**If 'do not know', go to Q 46**
44	Why do you agree/ why do you disagree?		
45	If you agree that Uganda is an HIV/AIDS "success story", what should happen to our AIDS control programs now that HIV is declining?	Relax AIDS control.......................................1 Further reinforce AIDS control...................2 Other (specify)..3 Do not know..88	**Ask only if respondent answered 'yes' to Q 43**
46	Are you satisfied that you are getting enough information from the government and NGOs regarding HIV prevalence trends (the number of people infected with HIV in your area, ie whether it is increasing or decreasing)	Yes...1 No...2 Neutral/no opinion.......................................3 Do not know.......................................88	**If do not know, go to Q 48**
47	Why are you satisfied/why aren't you satisfied?		
48	What methods do the government and other organizations use for telling the people about the numbers of people infected with HIV, and about the success of AIDS control programs? **(unprompted, circle all that apply)**	Newspapers..1 Radio...2 Drama groups..3 Community meetings.................................4 Pamphlets/magazines................................5 Church/mosque..6 LC1s/LC1 meetings....................................7 ANC education...8 Schools/teachers...9 Other (specify)...10 Do not know..88	
49	What methods should the government and other organizations use for telling the people about the numbers of people infected with HIV, and about the success of AIDS control programs? **(unprompted, circle all that apply)**	Newspapers..1 Radio...2 Drama groups..3 Community meetings.................................4 Pamphlets/magazines................................5 Church/mosque..6 LC1s/LC1 meetings....................................7 ANC education...8 Schools/teachers...9 Other (specify)...10 Do not know..88	

No.	Questions and filters	Coding Categories	Comments
50	Do you have any additional comments or questions?		

Thank you for participating in this survey. Your responses are very important to us.

Appendix D: Sample size calculation

$$C = \frac{P\,(1-P)D}{B} \times \frac{Z^2{}_{1-\alpha}}{L^2}$$

$$C = \frac{0.5\,(1-0.5)2}{7} \times \frac{(1.96)^2}{(0.1)^2}$$

C = 27.44

Sample size = 192.08

C= number of clusters

P = anticipated prevalence rate

D = design effect

α= size of the critical region (1- α is the confidence level)

$Z_{1-\alpha}$= standard normal deviate corresponding to the specified α

L = precision required

B = cluster size

Appendix E: Information Sheet for Household Surveys and FGDs

Fort Portal Health Department (letterhead)

Information Letter
General Population Survey

Study Title: Trends in Infection with Human Immunodeficiency Virus (HIV) in western Uganda

Objective(s):
To describe trends in HIV prevalence in rural Kabarole District; to compare rural and urban HIV prevalence trends in Kabarole District; and to determine public awareness of Uganda's declining HIV trends in the town of Fort Portal.

Investigators
Elizabeth Chapman, Department of Public Health Sciences, University of Alberta
Tom Rubaale, Health Department, Fort Portal, phone 078-856865
Dr. Walter Kipp, Department of Public Health Sciences, University of Alberta

Study Purpose
The purpose of this study is to describe trends in HIV infection in rural Kabarole district, and to identify differences between urban and rural trends. Another purpose of the study is to find out if residents of Fort Portal are aware of the decrease in HIV/AIDS in Kabarole District. We want to know whether they think HIV/AIDS has decreased, and how they explain the decrease.

Study Background
The survey aims to find out what people know and think about HIV infection trends in Fort Portal. The results will be used by the University of Alberta and Makerere University to study how the Ugandan Health Department communicates with the Ugandan public. The results will also be used to see how well HIV/AIDS programs are working.

Survey Procedures
You are being asked to take part in a verbal survey / FGD. The survey will take approximately 30 / 40-90 minutes. Your answers will be written/tape recorded by a researcher.

Confidentiality
All information collected will be kept confidential. Your name or other information that could identify you will not appear on the survey / FGD transcript. Only the university researchers will have access to your information. Two copies of the information will be made. One copy will be kept in Fort Portal in a locked cabinet in the office of Tom Rubaale. The other copy will be kept in a locked cabinet in the office of Walter Kipp at the Department of Public Health Sciences, University of Alberta, Canada. Information will be kept for five years, and then destroyed. ***Important note for FGD participants:*** While the researcher will do everything possible to keep what is said during discussions confidential, we cannot guarantee that other participants in the FGD will do so.

Benefits
Participants have the opportunity to potentially improve communication from the Ugandan Health Department regarding its National AIDS control programs. Answers provided by participants will help the Kabarole Health Department to see how well HIV/AIDS programs are working, and prove that they are successful.

Risks
There is a chance that participants may become emotional or stressed when discussing the topic of HIV/AIDS. Therefore, you may choose to end the interview/FGD at any time if this occurs. You do not have to give a reason, and your answers will not be used.

Freedom to withdraw
Participation is entirely voluntary. You may refuse to participate in this study. You are free to withdraw at any time. You do not have to answer any question that you do not want to answer.

Contact
If you have any concerns about any aspect of this study, you may contact the Health Department, Fort Portal, attention Tom Rubaale, phone 078-856865.

Department of Public Health Sciences

Appendix F: Consent Form for Household Surveys and FGDs

Public perceptions of HIV prevalence trends in Uganda

Part 1: Researcher Information

Primary Researcher:	Elizabeth Chapman
Affiliation:	Department of Public Health Sciences
Contact Information:	University of Alberta, Edmonton, Canada Telephone (Canada): 01-780-993-5972 E-mail: echapman@ualberta.ca
Name of Supervisor:	Dr. Walter Kipp
Affiliation:	University of Alberta, Edmonton, Canada
Contact Information:	Telephone (Canada) 01-780-492-8643 E-mail: walter.kipp@ualberta.ca

Part 2: Consent of Subject

	Yes	No
Do you understand that you have been asked to be in a research study?		
Have you read and received a copy of the attached information sheet?		
Do you understand the benefits and risks involved in taking part in this study?		
Have you been able to ask questions and discuss the study?		
Do you understand that you can refuse to be in the study or stop being in the study at any time? You do not have to give a reason.		
Do you agree to have a researcher contact you after the first interview/focus group discussion to ask a few more questions, if required?		
Do you understand who will have access to your records/information?		
Do you agree to allow the researcher to write down/audio-record your responses?		

Part 3: Signatures

This study was explained to me by (print name of research team member):

____

On (date): ______________________

I agree to take part in this study.

Name of Research Participant (*print*):

____

Signature or Thumbprint of Research Participant:

____

Witness (if available): ______________________________

Witness Signature or Thumbprint: ____________________________

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Research Team Member who obtained participant consent:

____

Date Consent Received:

Appendix G: Focus Group Discussion General Questions

General Questions

1)What are the HIV trends in Uganda since 1990?

2)What is responsible for these trends?

3)What are the HIV trends in Fort Portal/Kabarole since 1990?

4)What is responsible for these trends?

5)Have you heard that Uganda is considered a "success story" due to the decreasing HIV/AIDS levels?

6)Where have you heard this?

7)What is your definition of "success story"?

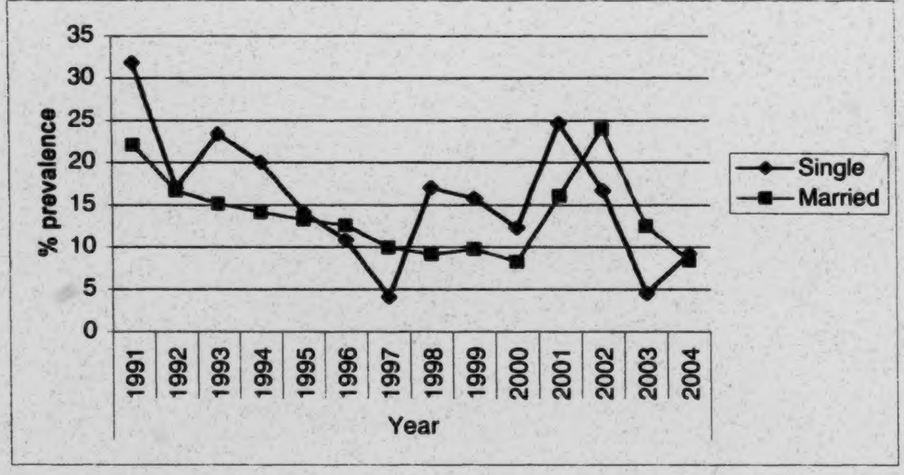
(ie less people are dying, ARVs are freely available, people are living longer, *new* infections are not occurring, people are widely aware of AIDS etc.).

8)Do you agree that Uganda is a success story? Why/why not?

9)Are you satisfied that you are getting enough information on HIV trends (number of HIV-infected people in your community) from the government and other organizations?

10)What methods do you recommend that the government and other organizations use for telling the people about the numbers of people infected with HIV, and about the success of AIDS control programs?

Appendix H: HIV prevalence trends by marital status (15-19 years)



Appendix I: Frequencies for Household Survey responses

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
Subcounty (N=252)	Eastern Zone	78	31	31	30.7	47	31.1
	Southern Zone	112	44.4	41	40.6	71	47.0
	Western Zone	62	24.6	29	28.7	33	21.9
	TOTAL	252	100	101	100	151	100
Parish (N=252)	Kasusu	41	16.3	17	16.8	24	15.9
	Kijanju	28	11.1	14	13.9	14	9.3
	Kagote	21	8.3	9	8.9	12	7.9
	Kibimba	14	5.6	7	6.9	7	4.6
	Nyabukara	14	5.6	6	5.9	8	5.3
	Rwengoma	14	5.6	8	7.9	6	4.0
	Bukwali	21	8.3	7	6.9	14	9.3
	Kitumba	14	5.6	6	5.9	8	5.3
	Njara	28	11.1	11	10.9	17	11.3
	Nyakagongo	14	5.6	6	5.9	8	5.3
	Bazaar	43	17.1	10	9.9	33	21.9
	TOTAL	252	100	101	100	151	100
LC1 (N=252)	ALL 36 LC1s:	7	2.8				
	TOTAL	252	100				
Respondent's house (N=252)	Semi-permanent	152	60.3	65	64.4	87	57.6
	Permanent	99	39.3	35	34.7	64	42.4
	Temporary	1	0.4	1	1.0		
	TOTAL	252	100	101	100	151	100
Respondent Role (N=252)	Head of household	84	33.3	56	55.4	28	18.7
	Spouse	83	32.9	3	3.0	80	53.3
	Son/daughter	54	21.4	27	26.7	27	18.0
	Relative	22	8.7	11	10.9	11	7.3
	Employee	6	2.4	2	2.0	4	2.7
	Friend	1	0.4	1	1.0		
	Other	1	0.4	1	1.0		
	Unknown/missing	1	0.4				
	TOTAL	252	100	101	100	151	100
Sex (N=252)	Male	101	40.1				
	Female	151	59.9				
	TOTAL	252	100				
Religion (N=252)	Catholic	117	46.4	52	51.5	65	43.0
	Protestant	77	30.6	26	25.7	51	33.8
	Muslim	33	13.1	16	15.8	17	11.3
	Pentecostal	13	5.2	1	1.0	12	7.9
	Seventh Day Adventist	7	2.8	3	3.0	4	2.6
	Cults	4	1.6	2	2.0	2	1.3
	Other	1	0.4	1	1.0		
	TOTAL	252	100	101	100	151	100
Occupation (N=251)	Self-employed	95	37.8	55	55.0	40	26.5
	Student	34	13.5	18	18.0	16	10.6
	Peasant	32	12.7	8	8.0	24	15.9
	Unemployed	21	8.4	1	1.0	20	13.2
	Housewife	19	8.0			19	12.6
	Professional	14	5.6	6	6.0	8	5.3
	Farmer	12	4.8	3	3.0	9	6.0
	Retired	11	4.4	4	4.0	7	4.6
	Other	9	3.6	4	4.0	5	3.3
	Businessman/woman	4	1.6	1	1.0	3	2.0
	Unknown/missing			1			
	TOTAL	252	100	101	100	151	100
Possessions Score	0	3	1.2	1	1.0	2	1.3
	1	26	10.3	8	7.9	18	11.9

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
(N=252)	2	65	25.8	24	23.8	41	27.2
	3	72	28.6	28	27.7	44	29.1
	4	51	20.2	24	23.8	27	17.9
	5	17	6.7	8	7.9	9	6.0
	6	13	5.2	7	6.9	6	4.0
	7	3	1.2			3	2.0
	8	2	0.8	1	1.0	1	0.7
	TOTAL	252	100	101	100	151	100
Monthly Income **(N=241)**	Seasonal	48	19.9	10	10.3	38	26.4
	< 100 000 ugsh	138	57.3	61	62.9	77	53.5
	100 000 - 200 000 ugsh	37	15.4	17	17.5	20	13.9
	200 000 – 300 000 ugsh	12	5.0	4	4.1	8	5.6
	> 300 000 ugsh	6	2.5	5	5.2	1	0.7
	Unknown/missing	11		4		7	
	TOTAL	252	100	97	100	151	100
Marital Status **(N=249)**	Single	111	44.6	64	64.0	47	31.5
	Married	95	38.2	32	32.0	63	42.3
	Widowed	28	11.2	3	3.0	25	16.8
	Divorced	15	6.0	1	1.0	14	9.4
	Unknown/missing	3		1		2	
	TOTAL	252	100	100	100	151	100
Education **(N=252)**	No education	27	10.7	7	6.9	20	13.2
	Lower primary	28	11.1	11	10.9	17	11.3
	Upper primary	82	32.5	32	31.7	50	33.1
	O-levels	77	30.6	31	30.7	46	30.5
	Technical	4	1.6	4	4.0		
	A-levels	8	3.2	5	5.0	3	2.0
	Tertiary institutions	24	9.5	10	9.9	14	9.3
	Other	2	0.8	1	1.0	1	0.7
	TOTAL	252	100	101	100	151	100
Heard of AIDS **(N=252)**	Yes	252	100	101	100	151	100
	No	0	0	0	0	0	0
	TOTAL	252	100	101	100	151	100
Where did you hear of AIDS? **(N=252)**	Radio/tv	198	78.5	82	81.2	116	76.8
	Health workers	128	50.7	48	47.5	80	53.0
	Friends/relatives	87	34.5	33	32.7	54	35.8
	Neighbours	61	24.2	16	15.8	45	29.8
	Other	46	18.2	23	22.8	23	15.2
	Newspapers/magazines	40	15.8	21	20.8	19	12.6
	Schools/teachers	38	15	15	14.9	23	15.2
	Church/mosque	24	9.5	9	8.9	15	9.9
	Community leaders	21	8.3	7	6.9	14	9.3
	Drama groups	12	4.8	4	4.0	8	5.3
	Posters/pamphlets	8	3.2	3	3.0	5	3.3
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
What are the main symptoms of AIDS? **(N=252)**	Skin disease	201	79.8	75	74.3	126	83.4
	Weight loss	179	71	73	72.3	106	70.2
	TB/persistent cough	132	52.4	51	50.5	81	53.6
	Diarrhea	122	48.4	41	40.6	81	53.6
	Fever	106	42	41	40.6	65	43.0
	Hairloss	77	30.5	28	27.7	49	32.5
	Weakness	57	22.6	33	32.7	24	15.9
	Headache	51	20.2	11	10.9	40	26.5
	Other	39	15.5	18	17.8	21	13.9
	Oral thrush/candidiasis	36	14.3	10	9.9	26	17.2
	Red lips	32	12.7	7	6.9	25	16.6
	Loss/gain in appetite	30	11.9	15	14.9	15	9.9
	Abscess	27	10.7	12	11.9	15	9.9

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
	Gastrointestinal/abdominal pain	26	10.3	9	8.9	17	11.3
	Vomiting	25	9.9	17	16.8	29	19.2
	Herpes zoster	22	8.7	38	37.6	47	31.1
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
What are the ways in which HIV is spread? **(N=252)**	Sexual intercourse	252	100	101	100.0	151	100
	Unsterilized/shared instruments	168	66.6	66	65.3	102	67.5
	Blood transfusion	49	19.4	26	25.7	23	15.2
	Mother to child transmission	30	11.9	12	11.9	18	11.9
	Other blood contact	28	11.1	9	8.9	19	12.6
	Sex with prostitutes	19	7.5	7	6.9	12	7.9
	Other	8	3.2	3	3.0	5	3.3
	Sex with multiple partners	8	3.2	1	1.0	7	4.6
	Kissing	7	2.8	5	5.0	2	1.3
	Drinking too much alcohol	3	1.2	1	1.0	2	1.3
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
What causes this illness called AIDS? **(N=252)**	HIV virus	170	67.5	73	72.3	97	64.2
	Other	18	7.1	8	7.9	10	6.6
	Don't know	64	25.4	20	19.8	44	29.1
	TOTAL	252	100	101	100	151	100
What can a person do to avoid getting HIV? **(N=252)**	Abstain from sex	222	88.1	90	89.1	132	87.4
	Use condoms	185	73.4	77	76.2	108	71.5
	Have only one sexual partner	94	37.3	40	39.6	54	35.8
	Use sterilized/unshared instruments	54	21.4	15	14.9	39	25.8
	VCT	34	13.4	15	14.9	19	12.6
	Other	19	7.5	11	10.9	8	5.3
	PMTCT	13	5.2	3	3.0	10	6.6
	Choose sexual partners carefully	13	5.1	3	3.0	10	6.6
	Do not have sex with prostitutes	9	3.6	2	2.0	7	4.6
	Don't take too much alcohol	9	3.6	5	5.0	4	2.6
	Sensitization	7	2.8	2	2.0	5	3.3
	Avoid blood transfusion	6	2.3			6	4.0
	Do not have sex with homosexuals	3	1.2	2	2.0	1	0.7
	Avoid mosquito/other bites	1	0.4			1	0.7
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Do you consider yourself at risk of getting HIV? **(N=251)**	Yes	137	54.6	54	53.5	78	52.0
	No	100	39.8	44	43.6	64	42.7
	Do not know	14	5.6	3	3.0	8	5.3
	Unknown/missing	1				1	
	TOTAL	252	100	101	100	151	100
If yes, why? **(N=136)**	Unsure of husband/boyfriend	42	30.9			42	53.8
	Have not tested	22	16.2	5	9.3	17	21.8
	Don't use condoms	20	14.6	9	16.7	11	14.1
	Other	18	13.1	12	22.2	6	7.7
	Sexually active	14	10.2	8	14.8	6	7.7

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
	Unsure of wife/girlfriend	13	9.5	13	24.1		
	Could get infected through cutting instruments	11	8.0	7	13.0	4	5.1
	Already positive	7	5.1	3	5.6	4	5.1
	Spouse died of HIV (or suspects)	5	3.6	2	3.7	3	3.8
	Could get infected through work	4	2.9	2	3.7	2	2.6
	Have extramarital affairs	4	2.9	4	7.4		
	Unknown/missing	1	0.7			1	
	Do not know	1	0.7			1	1.3
	TOTAL	N/A	N/A	N/A	N/A	N=78	N/A
If no, why? **(N=100)**	Abstaining other	42	42.0	10	22.7	32	50.0
	Trusts husband/boyfriend	14	14.0	1	2.3	13	20.3
	Is faithful	14	14.0	9	20.5	5	7.8
	Trusts wife/girlfriend	13	13.0	13	29.5		
	Other	12	12.0	6	13.6	6	9.4
	Will test before marriage	11	11.0	9	20.5	2	3.1
	Tested negative	9	9.0	3	6.8	6	9.4
	Use condoms	8	8.0	6	13.6	2	3.1
	Abstaining until marriage	8	8.0	3	6.8	5	7.8
	Born again/saved	6	6.0	1	2.3	5	7.8
	Has never had sex	3	3.0	1	2.3	2	3.1
	Have gone for test	2	2.0	2	4.5		
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Is it possible to cure AIDS? **(N=252)**	Yes	10	4	3	3.0	7	4.6
	No	233	92.5	94	93.1	139	92.1
	Do not know	9	3.6	4	4.0	5	3.3
	TOTAL	252	100	101	100	151	100
If yes, how can it be cured? **(N=9)**	Unknown/missing	243		98		145	
	ARVs	5	55.6	2	66.7	3	2.0
	Spiritual healing	4	44.4	1	33.3	3	2.0
	TOTAL	252	100	101	100	151	100
Are you aware of AIDS control programs in Kabarole District? **(N=252)**	Yes	237	94	97	96.0	140	92.7
	No	15	6	4	4.0	11	7.3
	TOTAL	252	100	101	100	151	100
Which programs do you know of? **(N=252)**	AIDS education/awareness programs	144	57.1	63	64.9	81	57.9
	VCT	142	56.3	59	60.2	83	59.2
	PMTCT	95	37.7	30	30.9	65	46.4
	ARV drugs	89	35.3	33	34.0	56	40.0
	ANC	75	29.8	15	15.5	60	42.9
	Seminars/workshops	32	12.7	17	17.5	15	10.7
	Treatment of AIDS-related illness	30	11.9	12	12.4	18	12.9
	Treatment of STDs	29	11.5	11	11.3	18	12.9
	Drama groups	25	9.9	13	13.4	12	8.6
	Condom distribution	22	8.7	9	9.3	13	9.3
	Other	22	8.7	10	10.3	12	8.6

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
	Home-based care for AIDS patients	7	2.8	3	3.1	4	2.9
	Feeding programs	3	1.2	2	2.1	1	0.7
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
How did you learn about these programs? **(N=252)**	Radio/tv	208	82.5	88	90.7	120	85.7
	Health workers	129	51.1	49	50.5	80	57.1
	Newspapers/magazines	34	13.5	14	14.4	20	14.3
	Schools/teachers	24	9.5	13	13.4	11	7.9
	Friends/relatives	23	9.1	7	7.2	16	11.4
	Church/mosque	23	9.1	12	12.4	11	7.9
	Community leaders	16	6.3	8	8.2	8	5.7
	Drama groups	15	5.9	3	3.1	12	8.6
	Other	14	5.5	7	7.2	7	5.0
	Neighbours	12	4.8	2	2.1	10	7.1
	Posters/pamphlets	3	1.2	1	1.0	2	1.4
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
How long have these programs been operating? **(N=237)**	1-10 years	92	38.8	39	40.2	53	37.9
	Over 10 years	67	28.3	29	29.9	38	27.1
	Do not know	48	20.3	17	17.5	31	22.1
	One year	29	12.2	12	12.4	17	12.1
	Unknown/missing	15		4		11	
	Less than one year	1	0.4			1	0.7
	TOTAL	252	100	101	100	151	100
Since 1990, what has happened to HIV in Uganda? **(N=252)**	Increased	122	48.4	42	41.6	80	53.0
	Decreased	113	44.8	53	52.5	60	39.7
	Stayed the same	9	3.6	4	4.0	5	3.3
	Do not know	8	3.2	2	2.0	6	4.0
	TOTAL	252	100	101	100	151	100
How did you get this information? **(N=252)**	Personal observation	157	62.3	60	59.4	97	64.2
	Radio/tv	137	54.4	59	58.4	78	51.7
	Health workers	38	15.1	17	16.8	21	13.9
	Newspapers/magazines	28	11.1	16	15.8	12	7.9
	Government workers	18	7.1	10	9.9	8	5.3
	Friends/relatives	11	4.4	5	5.0	6	4.0
	Other	11	4.4	5	5.0	6	4.0
	Schools/teachers	8	3.2	4	4.0	4	2.6
	Lost friends/relatives	7	2.8	1	1.0	6	4.0
	Church/mosque	6	2.4			6	4.0
	Neighbours	4	1.6	1	1.0	3	2.0
	Posters/pamphlets	3	1.2	1	1.0	2	1.3
	Drama groups	1	0.4			1	0.7
	Community leaders	1	0.4			1	0.7
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Why do you think it has increased/ stayed the same? **(N=122)**	Lack of sexual behaviour change	114	93.4	38	82.6	76	48.7
	People ignoring AIDS control messages	59	48.4	18	39.1	41	26.3
	Lack of condom use	35	28.7	12	26.1	23	14.7
	Other	29	23.8	15	32.6	14	9.0
	Bad lifestyle	25	20.5	8	17.4	17	10.9
	Sugar Daddies	10	8.2	4	8.7	6	3.8
	Widow inheritance/sleeping with HIV widows	7	5.7	2	4.3	5	3.2

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
	Lack of awareness/education	7	5.7	4	8.7	3	1.9
	No cure for AIDS	5	4.1	2	4.3	3	1.9
	Lack of ARVs	5	4.1	2	4.3	3	1.9
	Youth behaviour	4	3.3	1	2.2	3	1.9
	ARVs (no s/s)	3	2.5	1	2.2	2	1.3
	Lack of care for AIDS patients	1	0.8			1	0.6
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Why do you think it has decreased? **(N=113)**	Increased education/awareness	85	75.2	39	73.6	46	76.7
	Increased condom use	43	38.1	18	34.0	25	41.7
	ARVs/drugs	36	31.9	16	30.2	20	33.3
	Faithfulness	31	27.4	13	24.5	18	30.0
	Abstinence	26	23.0	11	20.8	15	25.0
	VCT	25	22.1	10	18.9	15	25.0
	Drama groups	14	12.4	7	13.2	7	11.7
	Other	13	11.5	9	17.0	4	6.7
	PMTCT	10	8.8	4	7.5	6	10.0
	People fear AIDS	10	8.8	3	5.7	7	11.7
	Decreased prostitution	3	2.7	1	1.9	2	3.3
	Decrease in premarital sex	3	2.7	2	3.8	1	1.7
	Those with HIV/AIDS have all died	1	0.9	1	1.9		
	Decreased number of partners	1	0.9	1	1.9		
	Do not know	1	0.9	1	1.9		
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Since 1990, what has happened to HIV in Fort Portal? **(N=252)**	Increased	116	46	40	39.6	76	50.3
	Decreased	113	44.8	52	51.5	61	40.4
	Stayed the same	15	6	6	5.9	9	6.0
	Do not know	8	3.2	3	3.0	5	3.3
	TOTAL	252	100	101	100	151	100
How did you get this information? **(N=244)**	Personal observation	193	79.1	82	83.7	118	80.8
	Radio/tv	119	48.8	52	53.1	69	47.3
	Health workers	94	38.5	37	37.8	58	39.7
	Friends/relatives	46	18.9	18	18.4	28	19.2
	Government workers	40	16.4	17	17.3	21	14.4
	Newspapers/magazines	29	11.9	17	17.3	13	8.9
	Neighbours	27	11.1	9	9.2	18	12.3
	Church/mosque	12	4.9	2	2.0	10	6.8
	Community leaders	12	4.9	3	3.1	9	6.2
	Other	10	4.1	4	4.1	7	4.8
	Schools/teachers	9	3.7	5	5.1	4	2.7
	Lost friends/relatives	8	3.3	3	3.1	6	4.1
	Drama groups	6	2.5	4	4.1	2	1.4
	Posters/pamphlets	4	1.6	2	2.0	2	1.4
	Unknown/missing	8		3		5	
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Why do you think it has increased? **(N=116)**	Lack of behaviour change	109	94.0	36	90.0	73	96.1
	People ignoring AIDS control	88	75.9	30	75.0	63	82.9

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
	messages						
	Lack of condom use	44	37.9	15	37.5	29	38.1
	Other	24	20.7	11	27.5	18	23.7
	Bad lifestyle	22	19.0	10	25.0	13	17.1
	Lack of ARVs	9	7.8	6	15.0	3	3.9
	Sugar Daddies	9	7.8	4	10.0	7	9.2
	Lack of awareness/education	6	5.2	2	5.0	4	5.3
	Widow inheritance/sleeping with HIV widows	5	4.3	2	5.0	4	5.3
	No cure for AIDS	3	2.6	2	5.0	2	2.6
	Youth behaviour	2	1.7	1	2.5	3	3.9
	ARVs (no s/s)	1	0.9	1	2.5		
	Do not know	1	0.9	1	2.5		
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Why do you think it has decreased? **(N=113)**	Increased education/awareness	85	75.2	41	78.8	44	72.1
	Increased condom use	59	52.2	32	61.5	27	44.3
	ARVs/drugs	52	46.0	21	40.4	31	50.8
	Faithfulness	42	37.2	21	40.4	21	34.4
	VCT	33	29.2	18	34.6	15	24.6
	Abstinence	29	25.7	13	25.0	16	26.2
	People fear AIDS	23	20.4	9	17.3	14	22.9
	PMTCT	17	15.0	4	7.7	13	21.3
	Drama groups	16	14.2	9	17.3	7	11.5
	Other	12	10.6	6	11.5	6	9.8
	Decreased prostitution	5	4.4	3	5.8	2	3.3
	Decrease in premarital sex	2	1.8	2	3.8		
	Decreased number of partners	2	1.8	2	3.8		
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Since 1990, what has happened to the number of people dying of AIDS in your village? **(N=251)**	Increased	108	43.0	34	34.0	74	49.0
	Decreased	128	50.9	59	59.0	69	45.7
	Stayed the same	11	4.4	5	5.0	6	4.0
	Do not know	4	1.6	2	2.0	2	1.3
	Unknown/missing	1		1			
	TOTAL	252	100	101	100	151	100
Since 1990, what has happened to stigma against people with HIV/AIDS? **(N=252)**	Decreased	125	49.6	51	50.5	74	49.0
	Stayed the same	73	29.0	25	24.8	48	31.8
	Do not know	32	12.7	16	15.8	16	10.6
	Increased	22	8.7	9	8.9	13	8.6
	TOTAL	252	100	101	100	151	100
Have you ever heard of VCT? **(N=252)**	Yes	248	98.4	101	100	147	97.4
	No	4	1.6			4	2.6
	TOTAL	252	100	101	100	151	100
Are VCT services	Yes	127	51.2	50	49.5	77	52.4
	No	48	19.4	17	16.8	31	21.1

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
being used in your village? **(N=248)**	Do not know	73	29.4	34	33.7	39	26.5
	Unknown/missing	4				4	
	TOTAL	252	100	101	100	151	100
If yes, what effect have VCT services had on HIV prevalence ? **(N=127)**	Decreased it	67	52.8	31	62.0	36	46.8
	Do not know	37	29.1	13	26.0	24	31.2
	Increased it	13	10.2	1	2.0	12	15.6
	Not changed it	10	7.9	5	10.0	5	6.5
	Unknown/missing	125		51		74	
	TOTAL	252	100	101	100	151	100
Have you heard of PMTCT? **(N=252)**	Yes	247	98.0	98	97.0	149	98.7
	No	5	2.0	3	3.0	2	1.3
	TOTAL	252	100	101	100	151	
Are PMTCT services being used in your village? **(N=247)**	Yes	142	57.5	48	49.0	94	63.1
	No	16	6.5	6	6.1	10	6.7
	Do not know	89	36.0	44	44.9	45	30.2
	Unknown/missing	5		3		2	
	TOTAL	252	100	101	100	151	100
If yes, what effect have PMTCT services had on HIV prevalence ? **(N=143)**	Decreased it	100	69.9	35	71.4	65	69.1
	Do not know	31	21.7	13	26.5	18	19.1
	Not changed it	10	7.0	1	2.0	9	9.6
	Increased it	2	1.4			2	2.1
	Unknown/missing	109		52		57	
	TOTAL	252	100	101	100	151	100
In your village, are people changing their sexual behaviour? **(N=252)**	Yes	106	42.1	52	51.5	54	35.8
	No	117	46.4	41	40.6	76	50.3
	Do not know	29	11.5	8	7.9	21	13.9
	TOTAL	252	100	101	100	151	100
If yes, what are the changes? **(N=106)**	Faithfulness	63	59.4	29	55.8	34	32.1
	Increased condom use	49	46.2	26	50.0	23	21.7
	Abstinence	44	41.5	24	46.2	20	18.9
	Increased education/awareness	27	25.5	13	25.0	14	13.2
	Decreased teenage pregnancies	17	16.0	6	11.5	11	10.4
	Other	16	15.1	6	11.5	10	9.4
	Decreased prostitution	13	12.3	7	13.5	6	5.7
	Decreased intake of alcohol	9	8.5	4	7.7	5	4.7
	Decrease in premarital sex	5	4.7	4	7.7	1	0.9
	Decreased number of partners	3	2.8	1	1.9	2	1.9
	Decreased rape	3	2.8	2	3.8	1	0.9
	Decreased peer pressure	2	1.9	2	3.8		
	Decreased widow inheritance	1	0.9	1	1.9		
	Negative changes	1	0.9	1	1.9		
	Do not know	1	0.9			1	0.9
	Unknown/missing	146					
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
How have	Decreased it	70	68.6	6	71.2	33	66.0

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
these changes affected HIV prevalence? **(N=102)**	Do not know	21	20.6	52	13.5	14	28.0
	Not changed it	9	8.8	7	11.5	3	6.0
	Increased it	2	2.0	37	3.8		
	Unknown/missing	150		49		101	
	TOTAL	252		101	100	151	100
Have you heard of the "success story"? **(N=252)**	Yes	164	65.1	78	77.2	86	57.0
	No	88	34.9	23	22.8	65	43.0
	TOTAL	252	100	101	100	151	100
Where have you heard this? **(N=164)**	Radio/tv	154	93.9	73	94.8	82	95.3
	Newspapers/magazines	42	25.6	26	33.8	16	18.6
	Government workers	36	22.0	18	23.4	18	20.9
	Health workers	25	15.2	16	20.8	9	10.5
	Community leaders	4	2.4	3	3.9	1	1.2
	Friends/relatives	3	1.8			3	3.5
	Church/mosque	3	1.8	1	1.3	2	2.3
	Other	3	1.8	2	2.6	1	1.2
	Posters/pamphlets	2	1.2	2	2.6		
	Schools/teachers	1	0.6			1	1.2
	Drama groups	1	0.6			1	1.2
	Unknown/missing	89		1		66	
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Do you agree with the "success story"? **(N=164)**	Yes	112	68.3	53	69.2	58	67.4
	No	48	29.3	23	29.5	25	29.1
	Do not know	4	2.4	1	1.3	3	3.5
	Unknown/missing	88		23		65	
	TOTAL	252	100	101	100	151	100
If you agree, why? **(N=112)**	Less deaths	49	43.8	22	41.5	27	46.6
	ARV distribution/free drugs	36	32.1	16	30.2	20	34.5
	Education/awareness/ sensitization	33	29.5	21	39.6	12	20.7
	Other	29	25.9	16	30.2	13	22.4
	Quantity/quality of programs	19	17.0	6	11.3	13	22.4
	Gov't support for programs	12	10.7	8	15.1	4	6.9
	Presidential mobilization	7	6.3	4	7.5	3	5.2
	PMTCT & VCT	7	6.3	3	5.7	4	6.9
	Funding/donor support	5	4.5	4	7.5	1	1.7
	Testimonials	3	2.7	2	3.8	1	1.7
	ABC strategy	3	2.7	2	3.8	1	1.7
	Fear of AIDS	3	2.7			3	5.2
	Unknown/missing	140					
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
If you disagree, why? **(N=48)**	Increased deaths	37	77.1	17	73.9	20	80.0
	Other	9	18.8	4	17.4	5	20.0
	No cure	8	16.7	5	21.7	3	12.0
	Increased infections	5	10.4	1	4.3	4	16.0
	Inaccuracy of prevalence figures	2	4.2	1	4.3	1	4.0
	Increased hospital admissions for	2	4.2	1	4.3	1	4.0

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
	AIDS						
	Lack of behaviour change despite sensitization	2	4.2	1	4.3	1	4.0
	People still spreading the infection	1	2.1	1	4.3		
	Increased # of orphans	1	2.1			1	4.0
	People ignoring sensitization	1	2.1	1	4.3		
	Success a political move	1	2.1	1	4.3		
	Drugs too expensive	1	2.1	1	4.3		
	Lack of education/awareness	1	2.1	1	4.3		
	Unknown/missing	204					
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
If you agree with the success story, what should be done with AIDS control programs now?? **(N=116)**	Further reinforce AIDS programs	104	89.7	51	92.7	53	86.9
	Keep programs the same	11	9.5	4	7.3	7	11.5
	Other	1	0.9			1	1.6
	Unknown/missing	136		46		90	
	TOTAL	252	100	101	100	151	100
Are you satisfied with HIV prevalence information? **(N=251)**	No	107	42.6	40	39.6	67	44.7
	Yes	104	41.4	44	43.6	60	40.0
	Neutral/no opinion	32	12.7	16	15.8	16	10.7
	Do not know	8	3.2	1	1.0	7	4.7
	Unknown/missing	1				1	
	TOTAL	252	100	101	100	151	100
Why are you satisfied? **(N=104)**	Radio/tv are sufficient	72	69.2	24	54.6	48	80.0
	Newsp/magazines sufficient	23	22.1	9	20.4	14	23.3
	Health workers sufficient	23	22.1	7	15.9	16	26.7
	Enough info (general)	15	14.4	11	25.0	4	6.7
	Schools/teachers sufficient	8	7.7	4	9.1	4	6.7
	Friends/fam/neighbours sufficient	6	5.8	1	2.3	5	8.3
	Workshops	6	5.8	4	9.1	2	3.3
	Govt is doing a good job	5	4.8	2	4.5	3	5.0
	Other	4	3.8			4	6.7
	Church sufficient	3	2.9	2	4.5	1	1.7
	Information enough, but public disregards it.	3	2.9	1	2.3	2	3.3
	Cmty mtgs/leaders sufficient	2	1.9	1	2.3	1	1.7
	Workplace sufficient	2	1.9	1	2.3	1	1.7
	Personal observation	1	0.1	1	2.3		

Frequencies for Cross-sectional Household Survey

Variable	Label	Total n=252	%	Male n=101	%	Female n=151	%
	sufficient						
	Unknown/missing	148					
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
Why are you dissatisfied? **(N=107)**	No radio = no info	29	27.1	5	12.5	24	35.8
	Insufficient at village level	25	23.4	14	35.0	11	16.4
	Insufficient info (general)	19	17.8	6	15.0	13	19.4
	Too busy/uninterested	13	12.1	4	10.0	8	11.9
	No newspapers/illiterate = no info	11	10.3	5	12.5	8	11.9
	Insufficient at household level	8	6.5	3	7.5	5	7.5
	No church/school/hospital = no info	7	6.5	4	10.0	3	4.5
	Info restricted to personal observation	5	4.7	2	5.0	4	6.0
	Knowledge restricted to village	4	3.7			4	6.0
	Info restricted to radio	3	2.8	1	2.5	2	3.0
	Not enough info to low-income people	3	2.8			4	6.0
	Inaccurate prevalence data	2	1.9	2	5.0		
	Other	2	1.9			2	3.0
	Stigma prevents info	2	1.9	2	5.0		
	Do not know	1	0.9			1	1.5
	No answer	1	0.9				
	Unknown/missing	145					
	TOTAL	N/A	N/A	N/A	N/A	N/A	N/A
What methods should be used for communicating HIV prevalence info? **(N=252)**	Radio/tv	191	75.8	73	72.3	118	78.1
	Household visits	106	42.1	44	43.6	62	41.1
	Seminars/workshops	92	36.5	41	40.6	51	33.8
	Community leaders	74	29.4	31	30.7	43	28.5
	Schools/teachers	69	27.4	24	23.8	45	29.8
	Community meetings	65	25.8	27	26.7	38	25.2
	Newspapers	59	23.4	32	31.7	27	17.9
	Church/mosque	54	21.4	19	18.8	35	23.2
	Village peer educators	51	20.2	26	25.7	25	16.6
	Drama groups	50	19.8	21	20.7	29	19.2
	Pamphlets/magazines	38	15.1	17	16.8	21	13.9
	Other	37	14.7	18	17.8	19	12.6
	ANC education	28	11.1	6	5.9	22	14.6
	Videos	8	3.2	4	4.0	4	2.6
	TOTAL	252	100	101	100	151	100